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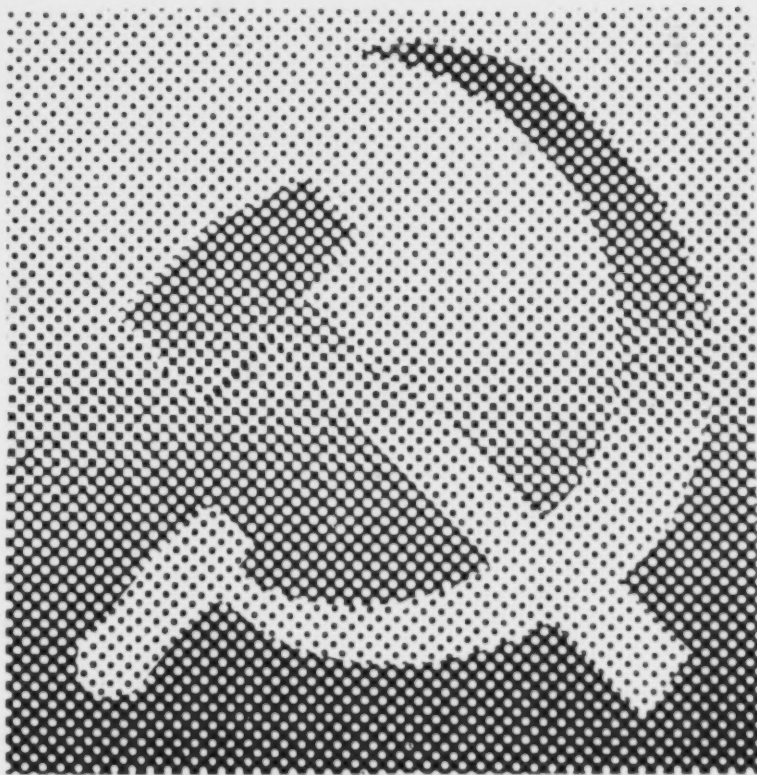
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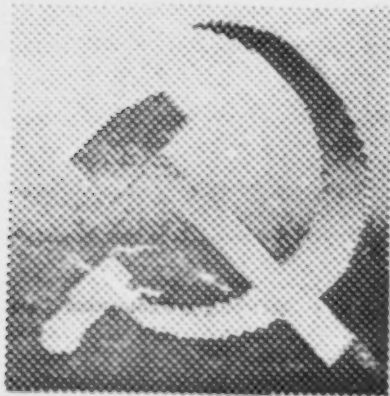
A Soviet View



SOVIET MILITARY THOUGHT

D 301.79:

Camouflage
Part I
Operational Camouflage
of the Troops
Part II
Camouflage of Actions
by Ground Force
Subunits
A Soviet View



Part I

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Moscow 1975

Part II

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Moscow 1976

TRANSLATED AND PUBLISHED
UNDER THE AUSPICES OF
THE UNITED STATES AIR FORCE

Published with the approval
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Agency of the U.S.S.R.

Library of Congress Cataloging-in-Publication Data

Camouflage : a Soviet view.

(Soviet military thought; no. 22)

"Published with the approval of the All-Union
Copyright Agency of the U.S. S. R."

Supt. of Docs. no.: D 301.79:22/Pt. 1-2

Contents: pt. 1. Operational camouflage of the
troops / V.A. Matsulenko -- pt. 2. Camouflage of
actions by ground force subunits / A.A. Beketov, A.P.
Belokon, S.G. Chermashentsev.

1. Camouflage (Military science)-- Soviet Union.

I. Matsulenko, Viktor Antonovich Operativnaya
maskirovka voisk. English. 1989. II. Beketov, A.A.
(Anatolii Afanas'evich). Maskirovka deistviy pod-
razdeleniy Sukhoputnykh voisk. English. 1989.
III. Belokon', A.P. (Anatolii Prokof'evich)
IV. Chermashentsev, S. G. (Sergei Grigor'evich)
V. Series.

UG449.C36 1989

355.4

88-600452

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The translation and publication of **Camouflage** does not constitute approval by any U. S. Government organization of the inferences, findings, and conclusions contained in this volume. Publication is solely for the exchange and stimulation of ideas.

PART I: OPERATIONAL CAMOUFLAGE OF THE TROOPS

U.S. EDITOR'S KEY TO MAP AND DRAWING ABBREVIATIONS

A—army	ITB—independent transport battalion
AA—assault army	m—meter
ABDs—artillery breakthrough divisions	mm—millimeter
AC—army corps	MC—mechanized corps
AG—army group	MD—mechanized division
ags—assault guns	mcks—mock-ups
AR—artillery regiment	MGB—machine gun battalion
Bds—brigades	mns—minutes
CG—corps group	MtnRD—mountain rifle division
cm—centimeter	OG—operational group
CPA—crossing preparation area	p/u—prepared and unloaded
Cps—companies	(R)—Romanian
d—diameter	RC—rifle corps
Dt—detachment	RD—rifle division
Echs—echelons	reg—region
FEBA—forward edge of the battle area	RnDt—reconnaissance detachment
FR—front reserve	SID—security infantry division
(G)—German	spg—self-propelled gun
GA—guards army	SS—Nazi SS
GMC—guards mechanized corps	STFs—simulated tank formations
gns—guns	TA—tank army
GRC—guards rifle corps	TC—tank corps
GRD—guards rifle division	TD—tank division
GTA—guards tank army	tnkr—tanker truck
GTC—guards tank corps	tnks—tanks
ID—infantry division	Unts—units
inf—infantry	vhc—vehicle
IR—infantry regiment	

Introduction

Camouflage is an aspect of security of combat operations that has as its goal the concealment of troops and military objectives from enemy reconnaissance and the deception of the enemy about the disposition, strength, composition, operations, and intentions of friendly troops. Camouflage is achieved by using natural and artificial screens and technical means; by making periodic changes of army (or navy) dispositions and command and control posts; by conducting feints and deceptive operations with units, formations, and field forces; by concealing true objectives and by constructing false ones; and by destroying or altering some of the external markings and characteristics of these objectives.¹

Camouflage is divided into tactical, operational, and strategic.

Tactical camouflage is conducted in the troops by the command and staffs of formations, units, and subunits.

Operational camouflage is one of the main means of achieving operational surprise. It is carried out to disorient the enemy about impending combat operations, the intent of an operation, its scale, and the time of execution. One of the main missions of camouflage is to conceal front and army assault groupings from the enemy.² Included in the main methods of carrying this out are deception of the enemy, wide use of different technical means and terrain conditions, measures to protect military secrets, concealed command and control, and so forth.

The success of operational camouflage is achieved by the development of a situation plan that corresponds to the specific conditions, by the timely and precise execution of the intended measures, by the troops' strict observance of camouflage, and by constant monitoring. Formations and units of the ground forces, air force, air defense forces, coastal forces, and, on coastal axes, navy are used to conduct operational camouflage.

Strategic camouflage is the concealed preparation of a strategic operation or campaign and the disorientation of the enemy about the real intentions and operations of the armed forces.

Formulation of the most important theoretical positions on camouflage as an aspect of combat support of troop operations began before the Great Patriotic War. Thus, the 1939 Workers' and Peasants' Red Army Draft Field Service Regulations required superiors of all grades, without waiting for special instructions, to camouflage units and their operations in any

situation. The regulations noted that the enemy could be deceived by concealing real objectives from reconnaissance and observation, by distorting (altering the external appearance of) objectives, by constructing false objectives (simulation), by practicing deception (feints, dissemination of various rumors), and so forth. The regulations stressed that camouflage should be natural, constant, and diverse. To carry it out successfully required that the troops observe camouflage discipline. To camouflage objectives, it was necessary first of all to use natural conditions (natural features, vegetation, and so on), and then to resort to artificial camouflage.

"The decision made by the commander on camouflage, under the overall plan developed by the staff," the regulations noted, "is to be carried out by the troops, combat engineers, and camouflage units under the leadership of the chief of engineers."¹ The regulations required constant checking of the camouflage by reconnaissance aircraft, air observation, and aerial photography.

The Great Patriotic War confirmed the correctness of the prewar views. During the war camouflage was widely used, constantly improved, and played an important role in the successful support of troop combat operations.

Because operational camouflage has not found sufficient elucidation in military historical literature, an attempt is made in the present study to fill this gap to some extent.

The author, using documents from the Archives of the USSR Ministry of Defense and other materials, has sought to objectively analyze the measures taken by front and army commands and their staffs for operational camouflage of the troops in some of the most important operations of the Great Patriotic War. The author has further attempted to disclose the most instructive aspects of operational camouflage and to show the constantly growing skill of officers and generals in handling this important mission. Strategic and tactical camouflage are briefly covered in specific examples in the work, since they are closely linked with operational camouflage.

Notes

1. *Kratkiy slovar operativno-takticheskikh i obshchevoinnykh slov (terminov)* [A Brief Dictionary of Operational-Tactical and General Military Terms] (Moscow, 1958), p. 155; *Tolkovyy slovar voennykh terminov* [Explanatory Dictionary of Military Terms] (Moscow, 1966), p. 228.
2. *Ibid.*
3. *Polevoy ustav RKKA (proyekt) 1939* [Workers' and Peasants' Red Army Field Service Regulations (Draft) 1939], Sections 198-200, 203-212.

Chapter 1. Operational Camouflage in Operations During the First Period of the War

The first days of the Great Patriotic War showed that our troops rarely resorted to operational camouflage. In June 1941, by order of the chief of the General Staff, the Red Army's Main Military Engineering Directorate sent the troops instructions on operational camouflage.¹ The instructions defined operational camouflage and indicated the goals and methods of its execution. Operational camouflage was divided into two types: operational (a series of diversionary attacks on a wide front before the start of operations on the main axis; intensified reconnaissance by all branches of troops on secondary axes, and so on) and engineer (concealment of real objectives and construction of false objectives, deception of the enemy's air reconnaissance).

The instructions determined the order of formulating a general camouflage plan developed by a field formation's staff in accord with the commander's decision. The plan included specific camouflage missions for separate axes and areas, and, when needed, for separate stages of an operation.

The duties of the chief of the engineer forces were presented in detail in the instructions. The chief was to assess the camouflage situation in the status report to the commander, organize camouflage reconnaissance of both the most important and least-studied march routes and terrain sectors—for which aerial photographs and scheduled flights were to be used—give instructions on the conduct of camouflage to subordinate units and formations of all branches of troops, and supply camouflage and engineer units with materials and equipment.

The main methods of engineer camouflage for operationally important objectives were set forth in a special section.

Attached to the instructions was an approximate plan of camouflage operations and their standards.

In accord with the requirements of the instructions, the troops began to devote more attention to operational camouflage, which had positive results. However, study of the experience of the war's first months showed that the command and staffs of formations and field forces often saw camouflage only as something to keep men and equipment safe from

enemy reconnaissance, and did not devote the proper attention to planning and conducting other forms of camouflage.

A 5 September 1941 directive from the chief of the General Staff noted that the use of combat stratagems to give the enemy a false idea about our concentrations and purposes was rare.² However, even a few examples of camouflage were evidence of its effectiveness. Thus, the false airfields built on the Northern Front were bombed by the enemy two or three times a day. On 27 July 1941, enemy aircraft bombed a false fuel and lubricant warehouse near Staraya Toropa, built before the war, while the real warehouse nearby was not reconnoitered by the enemy and was not subjected to attack, despite insufficient camouflage.

The directive required that the staffs of formations and field forces, while developing plans, should simultaneously consider how to deceive the enemy about our intentions and, in accord with this, give the troops practical instructions on where, on what scale, and how to create false objectives.

The document noted that elementary rules of camouflage were not being observed in units and formations: emplacements and other installations were not camouflaged in a timely fashion and, for the most part, were camouflaged only from ground observation; equipment (tanks, guns, vehicles, and so forth) was painted colors that contrasted sharply with the background of the terrain where it was placed; regulation camouflage material was used incompetently, and sometimes not even as intended. The directive obliged command personnel to instruct the soldiers in camouflage, to supervise the camouflage, and to eliminate deficiencies in good time.³

After showing in specific examples the need to conduct camouflage, the directive required that the command and staffs of the fronts and armies promptly put into practice the instructions of the General Staff.

In fall 1941, fierce battles unfolded on the approaches to Moscow, the capital of our Motherland.

The fascist command planned to break through the defenses of the Soviet troops with attacks by powerful tank forces from near Dukhovshchina, Roslavl, and Shostka and surround the main forces of the Western, Reserve, and Bryansk fronts near Vyazma and Bryansk. After this, infantry formations would mount a frontal attack on Moscow from the west, and tank and motorized units would attack the city in an envelopment from the north and south.

In these grave days for our Motherland, the Communist Party and the Soviet Government mobilized all of the people to defend the capital. The

Supreme High Command took a series of urgent measures to wear down the enemy through stubborn resistance to gain the time needed for the creation of a new defensive line and the arrival of reserves from the interior of the country.

The Red Army won the defensive battle at Moscow.

Camouflage played a big role in this. The staffs of the armies, carrying out the 5 September 1941 directive of the chief of the General Staff, had given appropriate instructions to the subordinate formations. Thus, the order of General K. D. Golubev, the commander of the 43d Army, required the elimination of all deficiencies in the camouflage of defensive installations, artillery positions, and troop dispositions, the wide use of false defensive installations, and the equipping of false batteries and tank dispositions.

Before each operation, the order said, the staffs should make camouflage plans.⁴

After this, the army troops began to turn to the use of stratagem more widely and purposefully.

In the units and formations of General K. K. Rokossovskiy's 16th Army, sod, brush, assorted screens, the protective embrasures of permanent emplacements, earth and timber emplacements, foxholes, and communications trenches were used to camouflage defensive field installations.⁵

Vertical screens were installed on all main supply and evacuation routes that came under observation and were fired on by mortars and artillery.

Organizing and improving the defense, the troops often established a false forward edge, which extended 1 to 1.5 kilometers from the real one. Dummies were placed in the trenches, and machine gun positions were rigged up; specially detached troops periodically conducted fire.

The goal of creating a false forward edge was to force the enemy to conduct artillery and air preparation in vain while going over to the offensive.

When there was snow, heavy machine guns, mortars, artillery, tanks, and other equipment were painted white. To camouflage artillery mounted in fire positions, strips of white material were used and were stretched over the guns with ropes.⁶

The experience of Soviet troops in defensive operations at Moscow showed the effectiveness of using such methods of operational camouflage as the creation of a false forward edge and operational pockets; the concealed disposition of reserves and second echelons; maneuvers by men and equipment; timely withdrawal of the troops from positions into the depth of the defense at the start of the enemy's artillery preparation; the creation of groupings for attacking the flanks and rear of enemy troops wedged into our disposition; the laying of ambushes; and the wide use of roving guns and batteries.

No less important for the successful conduct of defensive operations was engineer camouflage to construct false obstacles, strongpoints, and installations on the false forward edge and to conceal gaps between strongpoints and centers of resistance; to simulate reinforcement of artillery on separate axes by setting up false artillery positions; to prepare a system of false airfields and landing areas; and to create false dispositions for tanks, reserves, command posts, and so on.

At the end of November and start of December our troops on the Western axis received considerable reinforcements. According to the main indicators, however, superiority in this sector of the front remained with the enemy. By 1 December the fascist German troops numbered more than 800,000 soldiers and officers, about 10,400 guns and mortars, and 1,000 tanks. Our opposing forces numbered about 720,000 men, with 5,900 guns and mortars and 670 tanks.

The Supreme High Command of the Soviet Army planned to defeat the enemy assault groupings, weakened during our defensive operations, using the forces of the Kalinin, Western, and Southwestern fronts.

The immediate mission of the Western Front was the destruction of the enemy assault groupings northwest and south of the capital. The Kalinin Front was to seize Kalinin by a powerful attack and break into the rear of the German troops operating against the Western Front. The Southwestern Front was to defeat the enemy near Yelets and thus assist the troops of the Western Front in destroying the enemy near Tula.

The counterattack of our troops was begun on 5-6 December 1941 on a front extending over 200 kilometers. By 17 December the Soviet troops advancing north and northwest of Moscow had thrown the enemy back by up to 60 kilometers—up to 90 kilometers near Tula and Yelets—had inflicted an important defeat on the enemy, and had eliminated the direct threat to Moscow. During the further development of the counterattack, Soviet troops, overcoming the enemy's stubborn resistance, attacked constantly along the entire front.

The victory at Moscow was the outstanding event of the first year of the Great Patriotic War. In this battle the Red Army, for the first time in 6 months of war, inflicted a major defeat on the main force of Hitlerite troops and won the strategic initiative from the enemy. The victory had a great effect on the entire subsequent course of World War II. It showed that the Red Army could defeat the lauded fascist German troops. It also aided the development of a resistance movement in the countries enslaved by the Hitlerites, evoked great enthusiasm in the popular masses in the states of the anti-Hitler coalition, and inspired them to intensify the struggle against fascism. The defeat of the Germans at Moscow had a sobering effect on reactionary groups in Japan and Turkey.

The success of the counterattack at Moscow depended greatly on the troops' operational camouflage. As is well known, the Supreme High Command managed to ensure the surprise of the Soviet troops going over to the counterattack. This was achieved by keeping the counterattack plan a deep secret (a small group of people in the highest command echelons knew about it) and by secretly regrouping, moving, and deploying the troops. Unknown to the enemy, the command had moved considerable reserves from the rear to the front line. The troops strictly observed camouflage discipline and traveled only at night. Lighting fires was categorically forbidden, as was radio transmission and conversation about the preparation of the counterattack. Camouflage of supply centers and traffic routes was successful.

The staffs of all elements supervised the troops' execution of camouflage discipline. As a result, enemy reconnaissance did not manage to discover the concentration of our troops before the start of the counterattack. Even on the 6 December daily report map of Hitler's general staff, only 7 of the Western Front's 10 armies were shown (the 1st Assault Army and the 20th and 10th armies were not recorded).

The attack of our troops at Tikhvin and Rostov further disoriented the enemy and pinned down its forces.

The timely conduct of operational camouflage on the Western Front played a definite role in the successful conduct of the general offensive at Moscow, starting on 10 January 1942 from the line of the Lama River. To deceive the Hitlerites, artillery and mortar fire began first in the zones of two rifle brigades operating on a secondary axis. This distracted the enemy's attention. As a result, after a 90 minute artillery preparation, the troops of the 20th Army successfully broke through the defense on the main axis. Under the attacks of the Soviet troops, the enemy began to fall back to the west, grasping for each populated area and natural obstacle.

At the start of February the fascist German troops showed stubborn resistance and halted the advance of our troops. After evaluating the

situation, the command of the Western Front and 20th Army began to carefully prepare a new offensive. In a short time, problems were worked out on coordinated action between the rifle formations and branches of troops and on command and control, communications, and combat and logistic support.

Front and army commands gave special attention to operational camouflage. To deceive the enemy this time, an attack was simulated on 16-19 February on the right flank in the zone of the 20th Army (the army's real attack was planned on the left flank). Tank and gun mock-ups were placed on the false axis. The firing of the guns was simulated by explosions of TNT charges, and the operation of the tank engines by radio loudspeakers. Reconnaissance soon detected the enemy starting to transfer troops to the army's right flank, where the false attack had been prepared.

Several hundred mock-ups of tanks, guns, vehicles, and aircraft were installed, on the scale of a front, on secondary axes. Fires were lit at night in the false concentration areas. The enemy moved its reserves up, and conducted more than a thousand aircraft flights.⁷

False airfields were set up in the front's rear area. One was built near Trushenka and Gorodenka. Aircraft mock-ups, made of snow, were installed on this field, and aircraft tracks were simulated on the landing areas with special sleds. Enemy aircraft made several raids on this airfield, dropped 60 aerial bombs, and repeatedly subjected it to machine gun and cannon fire from low-altitude flight.⁸

Much attention was given to the construction of false crossings. Near Posikha, General I. V. Boldin's 50th Army combat engineers built a false bridge across the Svoitsa 200 meters from the real one. The enemy attacked both bridges, but most of the bombs were dropped on the false one.⁹

During the offensive our troops were not always successful in their fight for populated areas. On 25 February a deputy of the Supreme High Command published a directive that said that the battle for populated areas was still a weak spot in our tactics.

The directive required that all commanders, before attacking populated areas, do the following: carefully reconnoiter enemy defenses; neutralize enemy fire systems by making wider use of guns moved forward for direct fire; practice concentrated and false switching of fire; make surprise attacks from the flanks and rear; and boldly bypass strongpoints, leaving them blockaded in the rear.

According to this document, special attention was to be given to camouflaging our troops and deceiving the enemy. Commanders had to be

taught to put the enemy under constant pressure, forcing it to use up ammunition in vain.¹⁰ The troops carried out these orders.

It should be emphasized that deception of the enemy in the battle at Moscow was achieved even though the enemy had the strategic initiative and had superiority in men and equipment.

However, some front staffs, lacking enough experience, sometimes violated the requirements of Supreme High Command General Headquarters on keeping operational plans secret. Thus, for example, in the staff of the Southwestern axis, operational plans were typed, and directives with the general outline of the operations were distributed to lower staffs. Supreme High Command General Headquarters condemned this practice and, in a directive of 18 January 1942, ordered a small group of people to be enlisted for developing operational plans. Documents were to be reprinted only for those personally responsible for execution, general directives for an operation were not to be sent to lower staffs, and particulars were not to be passed along by telephone, but delivered by responsible staff officers.¹¹

The experience of the combat operations at Moscow showed that the success of an offensive depends greatly on surprise. To achieve surprise it is primarily necessary to deceive the enemy and to conceal from the enemy one's intentions and preparations for an operation. Where commanders and staffs have given serious attention to camouflage, as a rule there has been success. On the other hand, where the enemy has managed to expose our plans, the troops frequently have suffered heavy losses and have not achieved the projected goals.

During the organization of the offensive each staff should make up a carefully thought out plan for camouflage and deception of the enemy. A stereotyped pattern must not be part of the methods and means of deceiving the enemy. Any pattern will be discovered.

During the approach of the troops, the occupation of the attack position, and the deployment of the artillery, blackout and sound masking must be strictly observed.

Experience has shown that passive camouflage should be supplemented by operations to deceive the enemy. For this, in areas where the offensive is being prepared, it is advisable to resort to feigned troop withdrawals from the front to the rear; to simulate bringing up reserves and increased operation of radios; to set up false concentrations of troops, artillery, tanks, and vehicles; to build new roads; to conduct scout searches; and to carry out intensified air reconnaissance.¹²

* * *

In July 1942 the troops of the Western and Kalinin fronts made a powerful attack on the Sychevka and Rzhev axes to cut off the Rzhev salient, which was held by the Hitlerites. After fierce battles, the Kalinin Front destroyed the enemy bridgehead on the left bank of the Volga, and the troops of the Western Front, after breaking through the defense of the German 9th Army, advanced to the Rzhev-Vyazma railroad by 6 September and outflanked the enemy's Rzhev forces from the south.

Operational camouflage aided the success of the troops of the Western Front. The purpose of the camouflage was to show a false troop concentration in the zone of the 43d, 49th, and 50th armies, and a false tank defensive area between the 49th and 50th armies. The plan was to deceive and disorient the enemy about the preparation of the real offensive operation on the Rzhev, Gzhatsk, and Vyazma axes, and to cause the enemy to assemble its forces where the diversionary attack of the 43d and 49th armies was planned and also to start air operations there.

This set of measures was called a camouflage operation for the first time. Staffs were created to direct the operation: one in the operations zone of the 43d and 49th armies, and another in the zone of the 50th Army. The staffs were headed by representatives of the Western Front: the former by Lieutenant Colonel Katayev and Senior Lieutenant Golubov, and the latter by Major Ushakov.

The operation used 4 camouflage and 3 rifle companies, 122 vehicles, 9 T-60 tanks, an anti-aircraft machine gun, and 11 radios (3 RBS, 8 RB); 833 mock-ups of tanks, vehicles, guns, tanker trucks, and field kitchens were prepared. Teams of camouflage specialists were formed from the indicated subunits to simulate the movement of tank and motorized rifle columns into the false concentration areas (after unloading at the railroad station) and their disposition in these areas.

To make the troop concentration appear realistic, the staffs maintained coded radio communications with higher staffs and with the camouflage specialist teams.

The techniques of simulating column movement were as follows. The teams of camouflage specialists placed tank and vehicle mock-ups on the routes indicated for them at night. This improvised column "moved" until detected by enemy aircraft. After that, the equipment was packed up and transferred to new routes or to false concentration areas. To attract the attention of the enemy's air reconnaissance to the false concentration areas, the camouflage specialists simulated vital activity in them. Using attached tanks and vehicles, they constantly formed tank and wheel tracks on the ground, towed tank mock-ups (three to five in each group),¹³ and lit fires at night. During enemy air raids accompanied by bombing, the teams

troop concentrations, forced the Hitlerites to conduct an air raid on Myatlevo station. On 22 August 1942, 25 bombers dropped several tons of bombs on the station, but did not cause substantial damage. The enemy evidently thought that troop unloading was going on at Myatlevo station because movement of false tank columns was being conducted at this time near Mochalki and Kurovo, 22 kilometers from Myatlevo.

In response to the false concentration of our units in the zone of the 43d and 49th armies, the fascist German command increased its force south of Yukhnov.

During the Rzhev-Sychevsk operation the staff of the engineer troops and the camouflage companies of the front gained great experience in organizing operational camouflage.

While the camouflage operation was conducted, standards were determined for deploying and removing false equipment. One hour was required for loading 10 tank or vehicle mock-ups; 30 minutes for 10 gun mock-ups; 1 hour for unloading 16 tank, vehicle, and gun mock-ups. Thirty hours were spent on the repair of mock-ups in the field (with 70 percent wear and tear). In this time, 40 tank mock-ups, 50 vehicle mock-ups, and 70 gun mock-ups were repaired.

As combat experience showed, a considerably larger number of rifle subunits, tanks, and antiaircraft systems had to be used to show great activity and to make the camouflage convincing. Each concentration area had to have a rifle company, three tanks, three antiaircraft machine guns, and three antiaircraft cannons.

For constant control over camouflage work, it was advisable to allocate an aircraft to the staff directing the camouflage operation.

Under the general camouflage plan of the front command, individual camouflage operations were to be conducted more widely at the army level. The plans of such operations were to be developed by the operational section of the army's staff together with the staff directing the camouflage operation.

* * *

In July 1942, when an enemy assault grouping broke through to the large bend of the Don, the greatest battle of World War II unfolded.

The Soviet command clearly saw that the enemy was trying to break through to the Volga near Stalingrad and seize this important strategic point and major industrial area. By doing this, the Hitlerites hoped to cut

off our communications connecting the center of the country with the Caucasus.

The open terrain of the Don and Volga steppes, where the fierce battles took place, made camouflaging the Soviet troops, combat equipment, defensive positions, and fieldworks much more difficult and permitted enemy reconnaissance, especially air reconnaissance, to detect Soviet operations and dispositions comparatively easily. Therefore, the commands and staffs at all levels took measures to organize careful camouflage of subordinate units and formations. The commanders of the formations and field forces required that troops use, in every way possible, favorable terrain and natural obstacles when carrying out different engineering measures in the defense. Special attention was paid to carefully covering and camouflaging flanks and boundaries and command and observation posts. However, during the organization of the defense around Stalingrad, these requirements were not always met: there was a lack of men and equipment to complete work on the camouflage of boundaries and different installations, especially those in the depth of the defense.

Special orders and combat instructions on the observation of camouflage discipline were published in all armies. Thus, on 18 July 1942, the commander of the 63d Army of the Stalingrad Front, General V. I. Kuznetsov, ordered the periodic renovation of the camouflage of foxholes and slit trenches so that they would conform with the background of the surrounding terrain.¹⁴

In a combat instruction of 10 August 1942, the staff of the 21st Army required that the troops conduct all regrouping at night or in foggy weather, and that all marches go around populated areas. It was even forbidden for individual persons to walk the streets during the day. When carrying out assignments, troops were supposed to move by concealed routes: through gardens, ravines, and shrubbery, while observing careful camouflage and adapting themselves to the terrain.

All crossing equipment, said the instruction, should be assembled and placed in a dispersed and concealed fashion on the left bank of the Don. Each division was to equip operable crossings, camouflage their locations, and change them as often as possible. In addition, each division was to prepare at least two false ferries on which mock-ups of guns, vehicles, wagons, and so forth, were to be installed.¹⁵

Much attention was devoted to observing blackout procedures. Thus, the commander of the Stalingrad and Southeastern fronts required the following of his unit commanders in an order of 20 August 1942:

"1. All vehicles of troop and army units, and of units of the front reserve, are to be equipped with blackout shields by 23 August of this year.

Transport during the night along army and front roads will be permitted only with headlights equipped with the indicated shields.

"2. The military councils of the armies will establish by instruction a zone of total blackout in the immediate rear. Movement in the zone of total blackout will be conducted without headlights.

"3. In an enemy air raid, when an air raid warning is sounded, or when required by the control service, lights should be quickly switched off, even shielded headlights. Vehicles not equipped for blackout and technically defective will be taken away and directed to front and army assembly points, are not to be returned, and are to be used for automotive parts.

"4. The commanders of units with motor transport under their authority are responsible for executing the current order. Control over front roads goes to the chiefs of the motor transport and road service directorates of the front; and over army roads, to the chiefs of the army sections. The chief of the Stalingrad garrison is to pay special attention to the execution of the current order during movement of vehicles in the city."¹⁶

During the defensive battles at Stalingrad, Soviet troops widely used different false installations to deceive the enemy. On 15 October 1942, 20 false tanks and 8 guns were installed and 334 trenches were dug on the main line in the defensive zones of the 36th and 29th rifle divisions of the 64th Army alone.¹⁷

Special attention was paid to equipping false artillery positions. Gun mock-ups were installed in them. To simulate blast marks, grass was tramped down, burned out, or mowed. False access paths were made to each gun. Some of the mock-ups were camouflaged so that the enemy would detect them and take them for real.

False artillery positions were often made to appear real by firing from roving guns, by simulating fire with the blast of explosive charges, by renovating mock-ups, access paths, and blast marks, by repairing damage, and by simulating the servicing of guns by gun crews (fires were lit, huts were built, and so forth).

The creation of a large number of false batteries deceived the enemy, forced it to expend shells and aerial bombs in vain, gave our real batteries great vitality, and secured their successful execution of the tasks before them.

In some armies at a great distance (up to 20 kilometers) from the real tank concentration areas, false concentrations were equipped where vehicle

mock-ups were installed, movement of two or three tanks was carried out periodically, and the appearance of troop activity was created. Special teams guarded such areas, simulated fires in them after an enemy air raid, repaired destroyed mock-ups, and manufactured new ones.

On the Stalingrad Front, to disorient the enemy about the true defensive line and to bring about the premature deployment of its main forces at a distance of 50 to 60 kilometers, forward detachments of the 62d and 64th armies were moved out, within the rifle divisions, to the Chir and Tsimla rivers. From 17 through 23 July they fought fiercely against superior enemy forces and then withdrew to the main defensive line.

Much attention was devoted to the concealed command and control of the troops. In all of the armies transmission of radiograms in open text was forbidden, as was coding by the standard message code of the radio operators on duty. Division communications chiefs organized control over radio operations and strictly supervised communications security.¹⁸

Broadcasting equipment was used successfully to disorient the enemy about the intentions of our command.

To conceal the real location of a broadcast station from the enemy, loudspeakers were moved forward or to the side and connected to the station with telephone wire. This directed enemy fire not to the source of the sound, but to the transmitter, where there were usually no people. A transmission was conducted with two or three loudspeakers in different directions, and thus the enemy was disoriented.

Operational and troop (tactical) camouflage added to the successful conduct of the defensive battles at Stalingrad.

In other—unexamined—operations of the first period of the war, operational camouflage of the troops also played a major role and, what is more, had features that must be mentioned.

In the Toropets-Kholm offensive operation of the Northwestern Front (9 January—6 February 1942), deception of the enemy became a part of operational camouflage. In this operation, besides the major attack, two more attacks were simulated in a 100-kilometer zone. This led to the dispersal of the reserves of the fascist German troops.

In the Barvenkovo-Lozovaya operation of the Southwestern and Southern fronts (18-31 January 1942) false information was disseminated by radio for the first time, simulating the advance and concentration of five rifle divisions on the left wing of the Southern Front.

It is also impossible not to speak briefly about those operations in which the operational camouflage of the troops and a number of important factors of the art of war were underrated. As a result, they were conducted unsuccessfully.

Thus, during preparation of the Kharkov offensive operation (May 1942), the command of the Southwestern Front did not take appropriate measures to conceal the regrouping and concentration of the troops, especially near the Barvenkovo bridgehead. "... The movement of large troop masses, ..." wrote Marshal of the Soviet Union K. S. Moskalenko, "took place without the proper organization and secrecy. Therefore, it was no surprise that the fascist German command guessed our intentions."¹⁹

During preparation of the Toropets-Kholm operation some marches were carried out in the daytime, and reconnaissance in force was conducted only in those sectors where the offensive was planned.²⁰

Feints and diversions were not always carried out skillfully and efficiently. In particular, in the Demyansk offensive operation of the Northwestern Front (July 1942) the real and false axes of the main attack in essence coincided.²¹

General Headquarters of the Supreme High Command, the General Staff, and the military councils of the fronts took all necessary measures to eliminate the deficiencies. This gave great positive results.

* * *

The combat operations of the Soviet troops in the first period of the war showed that operational camouflage was important for the successful conduct of defensive and offensive operations. As units and formations accumulated experience, they better camouflaged troops, equipment, and weapons and more frequently resorted to setting up false objectives and concentration areas and to using diversionary operations to deceive the enemy.

By the end of the first period of the war, the main forms of operational camouflage of the troops in different types of combat had been determined more clearly. In the offensive, they included the concealed concentration of men and equipment, the simulation of diversionary attacks on a secondary axis, and the dissemination of false information by radio. In the defense the methods were the feigning of highly echeloned, stable areas in weak sectors, the concealment of main defensive positions, the simulation of preparation for the offensive, and the creation of a false forward defensive line for premature deployment of enemy units.

To camouflage a regrouping of troops, their transfer to secondary axes was simulated, feints were conducted to show the concentration of units and formations in a different sector of the front, and false troop concentration areas were set up on traffic routes.

General Headquarters of the Supreme High Command, the General Staff, and the military councils of the fronts attempted to keep secret the plans for combat operations and to deceive the enemy by all means and methods. From battle to battle, and from operation to operation, operational camouflage of the troops was conducted more and more successfully.

"... The Soviet Armed Forces, ..." wrote Marshal of the Soviet Union G. K. Zhukov about the results of the first period of the war, "learned to keep their intentions in deep secrecy, to conduct deception on a broad scale, and to mislead the enemy. Concealed regroupings and concentrations made it possible to carry out surprise attacks against the enemy."²²

Notes

1. *Arkhiv MO SSSR* [USSR Ministry of Defense Archives], f. 106, op. 230332, d. 24, ll. 1-15. [Hereafter cited as *Ministry of Defense Archives*—U.S. Ed.] [The preceding abbreviations are Soviet archival designations: f., archive; op., inventory; d., item; l., folio—U.S. Ed.]
2. *Ministry of Defense Archives*, f. 208, op. 2511, d. 4, l. 1.
3. *Ministry of Defense Archives*, f. 208, op. 2511, d. 4, l. 3.
4. *Ministry of Defense Archives*, f. 398, op. 9381, d. 1, l. 32.
5. *Ministry of Defense Archives*, f. 398, op. 5934, d. 2, l. 119.
6. *Ministry of Defense Archives*, f. 326, op. 5066, d. 3, ll. 14, 15.
7. *Ministry of Defense Archives*, f. 208, op. 8034, d. 124, ll. 840-843.
8. *Ministry of Defense Archives*, f. 208, op. 8034, d. 124, ll. 840-843.
9. *Ministry of Defense Archives*, f. 208, op. 8034, d. 124, ll. 840-843.
10. *Ministry of Defense Archives*, f. 208, op. 2511, d. 1025, ll. 33-34.
11. *Ministry of Defense Archives*, f. 203, op. 2511, d. 1025, ll. 58-63.
12. *Ministry of Defense Archives*, f. 203, op. 2511, d. 1025, ll. 58-63.
13. *Ministry of Defense Archives*, f. 69, op. 272732, d. 1, l. 3.
14. *Ministry of Defense Archives*, f. 312, op. 4225, d. 8, l. 32.
15. *Ministry of Defense Archives*, f. 335, op. 5113, d. 84, l. 117.
16. *Ministry of Defense Archives*, f. 345, op. 5448, d. 2, l. 44.
17. *Ministry of Defense Archives*, f. 341, op. 5332, d. 4, l. 41.
18. *Ministry of Defense Archives*, f. 312, op. 4245, d. 8, l. 4.
19. K. S. Moskalenko, *Na Yugo-Zapadnom napravlenii* [On the Southwestern Axis] (Moscow, 1969), p. 186.
20. *Toropetsko-Kholm'skaya operatsiya* [The Toropets-Kholm Operation] (Moscow, 1943), p. 27.
21. *Voyenno-istoricheskii zhurnal* [Journal of Military History], 1973, No. 4, p. 14. [Hereafter cited as *Journal of Military History*—U.S. Ed.]
22. G. K. Zhukov, *Vospominaniya i razmyshleniya* [Recollections and Reflections], ll. (Moscow, 1974), p. 101. [Hereafter cited as Zhukov—U.S. Ed.]

Chapter 2. Operational Camouflage in Operations During the Second Period of the War

In the second period of the war the role of operational camouflage increased considerably. This was brought about because the enemy went over to a strategic defense and took all engineering measures to reinforce it and to frustrate the offensive of the Soviet troops. Under these conditions, breakthrough of the enemy defense became much more complicated. Deception and the dissemination of false information among the Hitlerites acquired even greater importance.

In the days when the Soviet troops had held back the onslaught of the fascist hordes with unparalleled heroism on the approaches to Stalingrad, the party Central Committee and the Soviet Supreme High Command prepared a powerful offensive in the south of the country to seize the strategic initiative from the enemy, crushing its troops and creating a turning point in the war. Under the leadership of the Communist Party the Soviet people, through immense labor, had put the national economy on a military footing by fall 1942. Military production increased, the organizational configurations of the Soviet Army were improved, and new reserves were created deep in the rear area. All of this produced the necessary conditions for carrying out a strategic offensive operation.

The plan of Supreme High Command General Headquarters called for surrounding and destroying the enemy force between the Don and Volga rivers with the forces of the Southwestern, Don, and Stalingrad fronts under the command of Generals N. F. Vatutin, K. K. Rokossovskiy, and A. I. Yeremenko. The Southwestern and Stalingrad fronts were to seize the flanks of the fascist German force with powerful attacks toward each other and, after linking up near Sovetskiy and Kalach, close the ring of encirclement. The Don Front was faced with destroying the enemy on the right bank of the Don with one attack, and cutting off the Hitlerite troops in the little bend of the Don from the main Stalingrad force with another. During the preparation for the counteroffensive unleashed at the start of October, the Soviet command had created powerful offensive groupings. And although the strengths of the sides were, in essence, equal, the Soviet troops had double and even triple superiority over the enemy on the axes of the main attack.

On the morning of 19 November 1942, gun salvos heralded the start of the gigantic battle that unfolded over a vast territory.

One of the important factors that ensured the success of the counter-offensive at Stalingrad was the operational camouflage of the troops carried out by Supreme High Command General Headquarters, the General Staff, and the military councils and staffs of the fronts and armies. This was the first time that camouflage had been so extensive and so diverse. Despite the complex situation (camouflage was conducted after long and difficult defensive battles and both sides were of equal strength), the goal of the Soviet command was achieved.

"The commander in chief," wrote Marshal of the Soviet Union A. M. Vasilevskiy, "introduced strictest secrecy into all initial preparations for the operation. We were ordered categorically to tell nobody anything about the operation, even members of the State Defense Committee. Stalin gave notice that he himself would speak to anyone necessary about preparations for the operation. G. K. Zhukov and I could pass to the commanders of the fronts only what directly concerned each of them, and not a word more. I dare say that, under those conditions, such a measure of caution was fully warranted."¹

Concealing the concentration of a huge number of troops and vast quantities of combat equipment, ammunition, fuels and lubricants, and rations was of decisive importance. With the fronts' severe lack of transport at that time, transportation presented a complex problem for military communications and motor transport.

What is more, the troops and equipment had to be reliably concealed and camouflaged from all types of enemy reconnaissance on the bare steppes. This demanded from personnel and commanders at all levels the strict observance of camouflage discipline and a massive expenditure of effort. Because of the efficient leadership of Supreme High Command General Headquarters, the General Staff, and the military councils and staffs of the fronts and armies, the difficult task of secretly concentrating large masses of troops, combat equipment, and munitions in the attack position for the offensive was executed successfully.

In September, to the Stalingrad area, over 22,000 carloads were brought up, in October over 33,000, and in November about 41,500 carloads of various cargos. Some units and formations, moving to the concentration areas, made marches of 300 to 400 kilometers (from Astrakhan and Kamyshin) at night. On the roads to the front 27,000 cargo vehicles were occupied daily. The motor transport of the General Headquarters Reserve alone moved more than 10 rifle divisions 200 to 250 kilometers to the Stalingrad area in September-October 1942. In the first 20 days of November motor transport delivered over 15,000 tons of cargo to the troops operating north of Stalingrad.

The transfer of troops for the Stalingrad Front, from 1 through 20 November, across the Volga, which was starting to freeze over, presented a special difficulty. In all, 160,000 soldiers, 10,000 horses, 430 tanks, 600 guns, 14,000 vehicles, and about 7,000 tons of ammunition were conveyed during this time.² The crossings were subjected to daily bombing by enemy aircraft. Because of this, some passages across the Volga often lasted up to 5 hours instead of the usual 40 to 50 minutes. Conducting the passages mainly at night promoted the successful execution of the missions assigned to the heroic sailors of the Volga Military Flotilla, commanded by Rear Admiral D. D. Rogachev. If passages were conducted during the day, smoke screens were used.

"Ensuring the secret concentration and deployment of large artillery forces, and the secret delivery of a large quantity of ammunition, was difficult for us," recalled Chief Marshal of Artillery N. N. Voronov. "To keep preparation for the offensive secret, it was forbidden to publish any written, printed, or graphic documents. At first, a few generals and officers were acquainted with the new combat missions. This, of course, made preparation for the operation difficult, and made us plan our work by front, and then by army. In my case, the number of officers who could be entrusted with such an important secret was also quite small. . . ."

"We were tormented in those days by this question: did the Hitlerite command know anything about our preparation for the offensive? According to all the data from our ground and air reconnaissance, the enemy had guessed nothing."³

The following indicates the deception of the enemy. During the week before our counterattack (12 November), the eastern foreign armies department of the general staff of the German ground forces described the situation in the south, ahead of the front of Army Group B, in the following manner: ". . . the enemy, apparently, does not have sufficient forces to develop broad operations."⁴ On 14 November, General Messe, the commander of the Italian troop operations on the Stalingrad axis, reported to Chiano, the Italian minister of foreign affairs, that "the Bolsheviks do not have sufficient forces to conduct operations on a large scale. . . ."⁵

Deceiving the enemy was important for the success of the counteroffensive. In mid-October 1942 Supreme High Command General Headquarters ordered the fronts to prepare for defense. Instructions were given in the directives on laying out defensive lines, preparing populated areas for all-round defense, building engineer obstacles, and so on.

The official decision of Supreme High Command General Headquarters on creating the Southwestern Front was put off until the end of October. Only the front commanders were acquainted with the counterof-

fensive plan, but even they were not enlisted for its development until November.

"... I was ordered," wrote A. M. Vasilevskiy, "to become acquainted with the counteroffensive plan of the commander of the Stalingrad Front, A. I. Yeremenko, and to consider his opinion, but was not enlisted for practical work on the preparation of the offensive until November, having kept the defense of Stalingrad as the main and sole mission for that time."⁶

On 25 October A. M. Vasilevskiy gave the following orders to the commanders of the Don and Southwestern fronts: "... a. conduct all marches only at night, placing the units in concealed positions for daytime rest; b. cover movement with aviation and antiaircraft units ... and assign to the military council of the front (or army) the problem of camouflaging each operation; develop and execute a decision for camouflage using operational and engineer camouflage and deception of the enemy; assign from the personnel of the staff of the engineer troops of the front and armies separate commanders who will be personally responsible for camouflage on a front and army scale."⁷ This order was successfully put into effect.

In summer and fall 1942, by order of Supreme High Command General Headquarters, the troops of the Kalinin and Western fronts conducted active combat operations on the Velikoluk and Rzhev-Vyazma axes against Army Group Center to give the enemy the impression that it was precisely here, and not in the southwest, that the winter operation was being planned. This measure had positive results. In October the Hitlerite command began troop concentrations, and by the start of November, had transferred 12 divisions to Army Group Center without considering other means of reinforcement.⁸ Troops of the Transcaucasus Front conducted a diversionary offensive operation on the Mozdok axis.

The concealment of preparations for the counterattack received much attention from the General Staff. It issued a special directive forbidding correspondence on preparation for the coming operation between the General Staff and the fronts and between the fronts and armies. All questions on the counteroffensive were to be resolved only through personal contact of representatives of General Headquarters (Generals G. K. Zhukov, A. M. Vasilevskiy, N. N. Voronov, and others) with the commanders of the fronts and armies; in the formations, all instructions were to be given only orally and only directly to those who were to carry them out. The directive required that the concentration of troops in front areas and their regrouping inside the fronts be conducted only at night.⁹

The military councils and staffs of the fronts and armies that had responsibility for executing the directives of General Headquarters and the General Staff planned and carried out extensive operational camouflage.

After making a major attack with the forces of the 5th Tank Army and 21st Army from the bridgeheads southwest of Serafimovich and near Kletskaya toward Kalach, the troops of the Southwestern Front (commander, General N. F. Vatutin; military council member, Corps Commissar A. S. Zheltov; chief of staff, General G. D. Stelmakh) camouflaged their crossings, command posts, and front and army rear objectives. Engineer troops built 22 bridges, 5 of them false, on the Don in the zone of active front operations (chief of engineer troops, General L. Z. Kotlyar). The accesses and approaches to the bridges were concealed from ground observation with vertical screens. Enemy reconnaissance aircraft, which appeared repeatedly over the Don, took the false bridge at Yelanskaya for the real one. Aircraft dropped over 200 aerial bombs of different sizes on it, but not one of them hit the target. The real bridge, below the false one, was not subjected to air attacks at all.¹⁰

Smoke was widely used to camouflage unit crossings and maneuvers. Thus, for example, on 19 November a false smoke screen 18 minutes in duration was laid on a 9-kilometer front in the 47th Guards Rifle Division. On the same day chemical warfare troops covered the maneuvers of the 26th Tank Corps with smoke, while subunits of the 37th and 38th detached chemical protection battalions, attached to the 5th Tank Army (commander, General P. L. Romanenko), covered the crossings over the Don with smoke.¹¹

The command and staff of the front attached importance to building reserve bridges. Two of them, on the right wing of the front at Yarskaya-2 and Ust-Khoperskaya, were temporarily out of use, the approaches that had been laid out were not opened, and direction indicators to the bridges were not set up.

The 32d and 33d detached camouflage companies successfully camouflaged rear objectives. The 32d Company (commander, Senior Lieutenant N. G. Nikolayev) camouflaged an unloading siding with an ammunition depot and a fuel depot of the 82d Army base at Uryupinsk and, from 9 through 23 December, the front's command post at Kalach. The 33d Company (commander, Lieutenant Ya. A. Zharov) worked from 8 through 28 November 1942 to camouflage a tank farm at Filonovo station and, on 8 December, set about camouflaging the tank farm of the rear services directorate of the Southwestern Front at Balashov.

To camouflage the unloading siding with the ammunition depot of the 82d Army base at Uryupinsk, false loading-unloading areas were set up, and the construction of a settlement of nine households was simulated. The work was done so well that drivers from motor transport columns repeatedly drove in to warm themselves and refill their vehicles with water.¹²

The front command post at Kalach was camouflaged in imitation of family garden plots. In addition, nine brick buildings, which stood out sharply against a background of white buildings, were camouflaged. The camouflaged area was 10,250 square meters, and the expenditure of work time was 7,720 man-hours.¹³

Large-scale camouflage was conducted in the armies. Camouflage achieved its purpose, for example, in the 21st Army (commander, General I. M. Chistyakov; military council member, Brigade Commissar P. I. Kraynov; chief of staff, General V. A. Penkovskiy).

The construction of false crossings and the simulation of concentrations of artillery and tanks were effective in deceiving the enemy. Thus, in the 76th Rifle Division, when a Focke-Wulf 189 tactical-reconnaissance aircraft appeared, combat engineers simulated the firing of a false battery with flashes of smoky powder charges. This was a success. Enemy artillery, using the data of spotter aircraft, repeatedly shelled this battery. In the zone of this same division, near Kletskaya, a false ferry with a mock-up of a gun was subjected more than once to group (five to seven aircraft) air raids.¹⁴ False crossings and troop "concentration" areas were bombed considerably more than real ones.

So that drivers would not lose their way with the coming of darkness, all roads leading to the crossings were staked out, marked, and supplied with guides and traffic controllers. Representatives of the troops making the crossing, under the direction of corps and division engineers, familiarized themselves with the terrain beforehand and conducted careful reconnaissance of the crossings and approaches to them, selecting the most concealed paths.

The 4th Tank Corps, commanded by General A. G. Kravchenko, was camouflaged well and skillfully. Nestled in gullies and underbrush against the sheer right bank of the Don, it was not detected, despite the operations of enemy aircraft. The tanks were camouflaged to match the terrain: they were covered with brush and strewn with sand, snow, or, in an area of chalk hills, with pieces of chalk.

The experience that the political directorate of the Southwestern Front (chief, Division Commissar M. V. Rudakov) had in organizing and conducting camouflage with powerful loudspeaker units deserves attention. In December 1942, near Verkhniy Mamon and Boguchar, the front's speaker unit operated for 4 hours at maximum power and drowned out the engine noise of the tanks concentrated in the attack position.

No less effective was the use in many divisions of groups of megaphonists on the forward edge near enemy troops. Usually, four to six

megaphonists were placed 50 to 200 meters from each other, and passed information in turn, but not in order of location. Such a method disoriented the Hitlerites and did not give them the opportunity to concentrate fire on the megaphonists.

During preparation for the counteroffensive, articles to deceive the fascist German command were printed in front, army, and division newspapers. Thus, in the newspaper of the 21st Army, articles were published periodically in which the need to further improve the defense was stressed ("The Other Day We Built a Good Shelter," "We Will Build an Impregnable Defense," "The Enemy Will Not Pass," and so on). This was supposed to give the enemy the impression that our troops were not thinking about an offensive in this sector.

To distract the Hitlerites' attention from the axis of the main attack, materials were published on proposed active operations on secondary axes: "Petrovka Will Be Ours," "Take Kamenka." Fictitious unit numbers and commanders' last names were periodically listed in articles and notices.¹⁵

On the Stalingrad Front (commander, General A. I. Yeremenko; military council member, N. S. Khrushchev; chief of staff, General I. S. Varennikov), from 29 September to 4 October 1942, troops from General F. I. Tolbukhin's 57th Army and from General T. K. Kolomiits' 51st Army seized a bridgehead near Tsatsa and Semkin for the advance of the front's assault grouping. This operation was also to draw away from Stalingrad part of the forces of the fascist German troops.¹⁶

Along with the intense battles taking place in the streets of Stalingrad, troop crossings and concentrations in the attack positions for the coming offensive operations south of the city were carried out at night. Two mechanized corps and a cavalry corps, five air defense artillery regiments, a tank brigade, two rifle divisions, and seven artillery divisions were ferried across to the western bank of the Volga, near Krasnoarmeysk and Vyazovka. All troop movements and crossings were successful.

"To continue to keep our plans secret," recalled Marshal of the Soviet Union A. I. Yeremenko, "artillery ranging fire was conducted by detached guns at different times in advance. Mechanized units, carefully camouflaged, were in assembly areas, and, with the coming of darkness, they were moved to an attack position at such a distance from the enemy that the rumble of the motors could not be heard."¹⁷

The troops of the Don Front (commander, General K. K. Rokossovskiy; military council member, Brigade Commissar A. I. Kirichenko; chief of staff, General M. S. Malinin) made two attacks: one with the forces of the 65th Army from east of Kletskaya to the southeast, and the other with

the 24th Army from near Kachalinskaya along the left bank of the Don toward Vertyachiy to cut off the Don enemy force from Stalingrad.

The 65th Army and the 21st Army of the Southwestern Front were supposed to break through the defense of the opposing troops, gain the flank and rear at the Don River, and then attack in a southeasterly direction toward Vertyachiy. Formations of the 21st Army attacked the Romanian troops, and those of the 65th Army attacked the Germans. The commander of the Don Front decided to reinforce the 65th Army at the expense of the other armies, secretly concentrate the troops in the attack position, and prepare for the offensive. To accomplish these tasks successfully, the front staff conducted operational camouflage.

"Much was done," wrote Marshal of the Soviet Union K. K. Rokossovskiy, "to deceive the enemy. We tried to convince the enemy that we were about to attack in the area between the rivers (on the front of the 24th and 66th armies—V. M.), and we conducted more active operations here. In the remaining sectors of the front (65th Army and right flank of the 21st Army—V. M.) intensified operations to dig trenches, raise fortifications, and so forth, were simulated. Any movement of troops into the areas from where they were to operate was carried out only at night, and all camouflage measures were observed."¹⁸

The troops of the front used smoke widely. Thus, the 24th Army (commander, General I. V. Galanin; member of military council, Colonel I. A. Gavrilov; chief of staff, General P. M. Verkhlovich; chief of chemical section, Colonel P. T. Fedotov) used smoke to blind enemy observation posts and fire positions, and to cover the movement of units of the 120th Rifle Division on the army's right flank. Smoke screening was carried out from five lines, including from rafts floating on the Don. In addition, artillery fire with smoke projectiles was conducted to cover the movement of infantry and tanks into the zone of advance of the 214th and 49th rifle divisions and to blind enemy observation posts and fire positions (appendix 1).¹⁹

The infantry and tanks, covered by smoke, executed their assigned missions.²⁰

Regrouping of the 120th, 49th, and 34th rifle divisions from the 66th Army into the operations area of the 24th Army's assault grouping was concealed from the enemy. Troop movements and cargo deliveries were carried out at night.

The plan for operational camouflage on the axis of the main attack of the front, where the command and staff's main attention was directed at camouflaging infantry, artillery, and tanks during their movement to the

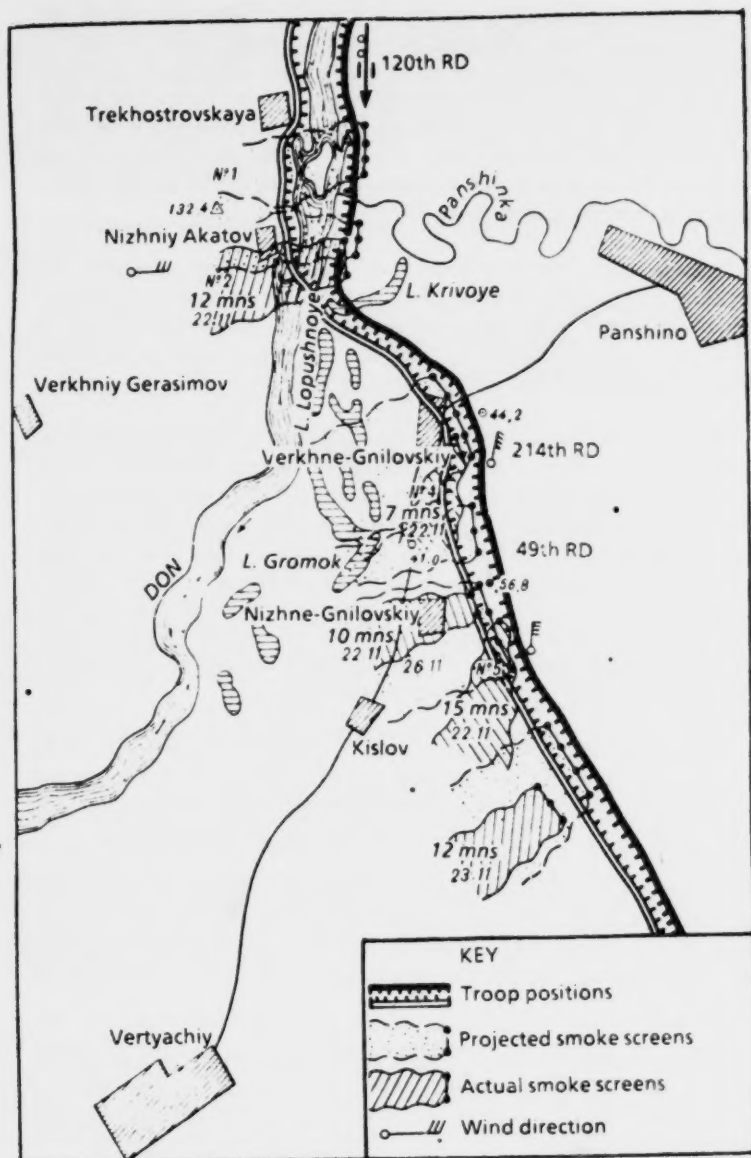


Figure 2. Use of smoke by the 24th Army in an offensive operation (22 November–2 December 1942).

attack position for the offensive and their disposition in it, was also carried out successfully. In addition, the real crossings were camouflaged, and false ones were built that were subjected to the main enemy bombing.²¹

"Concentration and regrouping of forces," recalled General of the Army P. I. Batov, "was conducted exclusively at night. Some formations and troop units even moved in an opposite direction, which deceived enemy reconnaissance. At the Kletskaya bridgehead, despite intensified reconnaissance flights by German aircraft, we managed to concentrate the main mass of our troops and equipment in time. In this area, the rumble of motors was not audible in the daytime, the movement of ground forces ceased, and everything died down."²²

In all armies of the Don Front there was camouflage of supply and evacuation routes, concentration areas, staffs, and rear objectives. Vertical screens were widely used and false concentration areas were set up. To deceive the enemy, collapsible mock-ups of tanks, guns of different calibers, mortars, vehicles, and tank trucks were prepared.

Much attention was given to operational camouflage in the 2d, 17th, 16th, and 8th air armies. Their commanders, Generals of Aviation K. N. Smirnov, S. A. Krasovskiy, S. I. Rudenko, and T. T. Khryukin, gave orders to build false airfields and to camouflage real ones. Airfields no longer used by aviation units were most often equipped as false ones. At these airfields mock-ups of aircraft were set up in abandoned aircraft shelters. Mock-ups of vehicles and antiaircraft guns were made of poles, brushwood, straw, and sod. Dummies of soldiers were placed near the mock-ups. A group of combat engineers, with an officer in charge, was allocated to create the impression that the false airfield was in use.

However, some false objectives and concentration areas were built carelessly and did not fit in with other army measures, and mock-ups and dummies were installed in insufficient numbers and were not realistic enough. Therefore the enemy easily saw through these attempts.²³

Sometimes, the camouflage conducted by the engineer troops was not in accord with general operational matters, and the staffs of the engineer troops of the armies were not enlisted to develop plans for deception. Because of this not all of the camouflage operations performed were effective.

Reconnaissance in force played an important role in operational camouflage. It was conducted by reinforced battalions and companies of rifle divisions on a wide front in all armies for several days before the start of the counteroffensive.

On the whole, operational camouflage of the Soviet troops achieved its goal in the counteroffensive at Stalingrad. The fascist German command did not manage to determine the intentions, composition, grouping, axes of attack of Soviet troops, or time of execution of the offensive.

After the war, Jodl, the former chief of staff of the operational leadership of the German armed forces, admitted that the Germans had not been able to detect the concentration of Soviet troops at Stalingrad. "We had absolutely no idea about the strength of the Russian troops in the area. There had been nothing here earlier, and suddenly an attack of great force was made, which was decisive. . . ."²⁴

Operational camouflage was carried out successfully by our troops in December 1942.

Thus, during the defeat of the enemy by troops of the Southwestern Front and right wing of the Voronezh Front from 16 through 31 December, regrouping of the units and formations was conducted in strictest secrecy, only at night, and under camouflage. On arrival in new concentration areas, the troops were positioned in previously prepared trenches, foxholes, and other shelters and were carefully camouflaged.²⁵

During preparation of the operation to defeat the fascist German "Goth" group near Kotelnikovo by troops of the Stalingrad Front on 12-31 December 1942, operational camouflage was conducted successfully in the 2d Guards Army, commanded by General R. Ya. Malinovskiy. By decision of Supreme High Command General Headquarters, the army was transferred from near Stalingrad to the Myshkova River. In a short time its command and staff developed a plan to regroup the formations to preempt the Hitlerites in seizing the line of the Myshkova River because it was a natural obstacle on the path to the surrounded force near Stalingrad.

The regrouping and concentration of the 2d Guards Army was complex. The troops had to travel 170 to 200 kilometers in severe frosts and blizzards. The march was conducted only at night. Forty to fifty kilometers had to be covered each 24 hours. Because of the good organization of the march, and because of the party political work and the strict observance of camouflage discipline, the army was concentrated in good time in its designated area.

The plan for the offensive on the Kotelnikovo axis was developed by the front and army staffs on a map and approved by the military council of the Stalingrad Front and by Colonel General A. M. Vasilevskiy, the representative of Supreme High Command General Headquarters. To keep secret the preparation for the operation, missions were assigned orally to army and corps commanders.²⁶

The attack of the Soviet troops was a surprise and placed the enemy in a difficult position. The Kotelnikovo force was defeated, and the Hitlerite command finally lost the ability to give aid to its troops surrounded on the Volga.

The operation to destroy the fascist German troops surrounded at Stalingrad began in January 1943. General Headquarters gave this mission to the troops of the Don Front. The plan of the Soviet Command first called for the enemy to be destroyed in the western section of the ring of encirclement, then in the southern section, and, later, for the remaining force to be cut into two parts and eliminated. During the battles from 10 January through 2 February 1943, Soviet troops defeated the surrounded fascist German divisions, took 91,000 soldiers and officers prisoner, and seized a huge quantity of equipment and weapons. The Stalingrad battle ended in victory for the Soviet Armed Forces.

Operational camouflage of the troops played a large role in the destruction of the enemy force.

Ten days before the start of the operation the chief of the engineer troops of the Don Front, Major General of Engineer Troops I. A. Proshlyakov, approved a camouflage plan to deceive the enemy in the zone of the 24th Army (appendix 2).²⁷ The plan called for measures to give the enemy the impression of preparing for a powerful attack from near Kotluban toward Kuzmichi and the state farm "Opytnoye pole," and to draw a maximum number of enemy forces to this sector of the front.

"Concentration" of a large force (a tank corps and 4 to 5 artillery regiments) was carried out near Kotluban. Mock-ups of tanks and guns were prepared by the 25th Detached Camouflage Company 75 kilometers from their place of installation. The mock-ups were brought to the indicated area by 15 vehicles.

To conduct operations and to make this area appear real, subunits of the 104th Engineer and Mine Battalion and the 25th Detached Camouflage Company were enlisted.²⁸

On 1 January 1943 reconnaissance of the indicated area was conducted. False artillery batteries were set up in the old fire positions of 3rd artillery regiments that had done battle here in the fall of the previous year. On 2 January the 104th Engineer and Mine Battalion began clearing the artillery entrenchments and installing mock-ups of guns and tanks. In all, 37 tank mock-ups, forty 152mm, sixty 76mm, and twenty 45mm gun mock-ups were installed. On 3-4 January an artillery regiment of the 260th Rifle Division conducted three or four firings from each of the false positions. The advance of new units was simulated by the forces of a regiment of the 260th Rifle Division. Two radios operated near the false tank concentration until 10 January.

The measures conducted to deceive the enemy brought positive results. Enemy aircraft appeared repeatedly over the false concentration area.

According to the data of the reconnaissance section of the army, the Hitlerites began to reinforce the antitank defense at the front of the 24th Army. An intercepted enemy radiogram reported a concentration of large Soviet forces near Kotluban. The Hitlerites held their reserves on this axis near Kuzmichi.²⁹

Thus, the enemy forces were confined to a secondary sector and did nothing while the 65th and 21st armies, attacking from the west, were defeating the enemy on the main axis of the front.

In the zones of the 66th and 57th armies, which had the mission of conducting active operations to pin down the opposing Hitlerite troops, camouflage operations were conducted on the initiative of the chiefs of the engineer troops. Here mostly disguise camouflage was used to feign a concentration of tanks and artillery.

During the battles to annihilate the surrounded force near Stalingrad, under a plan of the chemical section approved by the military council of the 24th Army, camouflaging and false smoke screens were widely used to disorient the enemy, to reveal enemy fire points, and also to cover the withdrawal of our infantry to the start lines for the attack. Smoke bombs and shells were used to blind the enemy's observation posts and fire positions.³⁰

The effectiveness of the use of smoke is supported by the following examples. On 5 January 1943, northeast of hill 154.2 in the sector of the 260th Rifle Division, two false smoke screens, 12 to 15 minutes in duration, were laid by chemical subunits. They provoked heavy enemy mortar, small arms, and machine gun fire. In both cases, the fire stopped with the dispersion of the smoke. On 11 January in the zone of the same division, a false smoke screen was laid in a 600-meter sector for 50 minutes. During the smoke screen the Hitlerites intensified their small arms, machine gun, and artillery fire. Specially detailed observers fixed the position of the enemy's fire points.³¹

Extensive operational camouflage was also conducted on the axis of the front's main attack. Thus, the plan of the 65th Army dated 7 January 1943 called for concealing the infantry, artillery, and tanks in the attack positions of the breakthrough sector.³² The army's engineer support plan for the offensive operation indicated the forces to be enlisted to gain the objective. Camouflaging and equipping the concentration areas of three artillery battalions and the army's artillery depot was carried out by the 31st and 32d combat engineer battalions and two companies of the 33d Combat Engineer Battalion. Camouflaging and preparing the concentration areas of the 5th, 9th, 10th, 14th, 15th, and 47th detached tank regiments and of the 91st Tank Brigade was conducted by the 34th and 35th

combat engineer battalions. The concentration areas of the rear service units and of the 65th Army's infantry were camouflaged and prepared by subunits of the 35th Combat Engineer Battalion.³³

Four days before the start of the operation, the troops of the front's assault grouping secretly occupied the attack position for the offensive. Camouflage and deception of the enemy greatly contributed to this.

The combat operations of the Soviet troops at Stalingrad showed clearly that well-organized and well-executed operational camouflage contributed to the achievement of surprise and to the successful conduct of the operation as a whole.

The Soviet command succeeded brilliantly in carrying out the concealed concentration and deployment of the reserve troops, equipment, and munitions. The Hitlerites thought that the offensive by the Soviet troops would begin on the western strategic axis, not on the south wing. Proceeding from this, in October–November 1942 the Hitlerites sent 18 divisions from the ground forces high command reserve to Army Groups North and Center and 10 divisions to Army Groups A and B; half of these arrived on the Lower Volga axis after our troops had gone over to the counteroffensive.³⁴

To conceal the axis of the main attack from the fascist German command, General Headquarters conducted offensive operations on other axes in summer and fall 1942, and, in mid-October, ordered the troops to pin down with active operations as many as possible of the enemy forces between the Volga and Don and to increase defensive operations in the remaining sectors of the front near Stalingrad.

Deception was carried out to distract the enemy's attention from the objectives and operations being concealed and to convince the enemy of the genuineness of the false measures conducted under the camouflage plan for the given operation. This goal was achieved by a system of diverse methods and means in accord with the operation and its camouflage.

The movement of troops and combat equipment and the transport of munitions were carried out only at night, and camouflage discipline was strictly observed.

Combat operations showed that operational camouflage should be carried out constantly in all services of the armed forces. Its success depends on the secrecy of the measures, the persuasiveness of the troops' feints and diversions, and the speed of their execution and logistic support.

The most important operational camouflage should be included in the general front or army operation plan.

The operational camouflage plan, which is based on the commander's plan for the coming defensive or offensive operation and takes into account the operations of adjacent units, gives the troops' camouflage plan and missions; the goal is to conceal friendly forces and their operations on the main axes and to draw the enemy's attention to false axes, objectives, and concentration areas.

This plan is developed under the leadership of the chief of staff of the front or army by a small group of people who represent all branches of troops and services of the armed forces.

Camouflage is later increased, in accord with the general offensive or defensive plan, as the operation develops. The camouflage measures must carefully conform with and complement one other, and must be put into practice by units, formations, and branches of troops under a single plan. As combat experience has shown, measures that are uncoordinated and not part of a single system do not ensure operational surprise, and can lead only to isolated tactical successes. In all types of combat operations, and during marches, the troops are obliged to camouflage during disposition in place, without waiting for special instructions.

The methods of deceiving the enemy must be diverse, and deception of the enemy depends greatly on the commander's resourcefulness. But every effort must be made to conceal one's forces, weapons, and sector of attack.

The approach of the troops, occupation of the attack position, and deployment of artillery and tanks should be conducted at night, with the observance of strict blackout and sound masking. Much attention should be given to setting up false airfields and camouflaging real airfields, aircraft, and rear objectives.

Camouflage is complemented by the troops' active operations to deceive the enemy. In the sector where the offensive is being prepared, it is advisable to organize the movement of separate troop units from the front to the rear. In sectors far from the axis of the main attack, it is advisable to simulate the approach of troops, the concentration of tanks, and the operation of radio equipment; to build false batteries and vehicle mock-ups; to lay out tracks of new roads; to conduct scout searches; and to carry out intensified air reconnaissance.

Artillery and tanks occupy fire positions primarily at night. Access roads, trails to command and observation posts, and lines of communication are carefully camouflaged.

Camouflaging troops during regrouping is done mainly by concealing the transfer of units and formations and their disposition in new areas; moving troops in other directions; simulating movement of men and equipment to secondary axes and concentrating them in non-active sectors of the front; displaying false concentration areas on traffic routes; creating false dispositions of men and equipment.

The construction of false batteries has special importance, because the first thing the enemy will do is reconnoiter and find our artillery positions so to direct artillery fire and dive bombers onto them. The construction of a large number of false batteries (two false batteries for one real one on the most important axes) allows the enemy to be diverted from the real batteries and ensures the latter's most complete execution of assigned missions.

Consequently, the combat operations at Stalingrad provide evidence that the greatest attention must be given to operational camouflage not only by the Supreme Command but also by front, army, and formation commanders and their staffs.

Great party-political activity in the troops, the front and army press, the exemplary behavior of communists and Young Communist League members, and the selflessness and heroism of the soldiers contribute to success in conducting operational camouflage.

* * *

The battle for the Caucasus, which lasted nearly 15 months, has gone down in the history of the Great Patriotic War as a complex set of defensive and offensive operations.

Ground forces, forces of the Black Sea Fleet and of the Azov and Caspian military flotillas, aviation, and partisans took part in this battle. Soviet troops had to operate on endless steppes, force crossings over rivers, and fight at sea, in the air, in forests, and in mountains.

The German supreme command developed a plan, code-named Edelweiss, to directly seize the Caucasus. The goal was to surround and destroy the troops of the Southern Front, who were withdrawing beyond the Don, south and southeast of Rostov, and seize the northern Caucasus. Later, one group of troops was to seize Novorossiysk and Tuapse, and another the oil-bearing areas of Groznyy and Baku. Simultaneously, troops were to cross the main range of the Caucasus through passes in its central portion, and reach Tbilisi, Kutaisi, and Sukhumi.

However, the Edelweiss plan was not destined to be carried out. Our troops won the battle for the Caucasus.

Operational camouflage was of great importance in achieving victory. This is how Marshal of the Soviet Union A. A. Grechko describes it in his book *Battle for the Caucasus* during preparation of the Transcaucasus Front offensive in December 1942:

"In the Northern group of forces a false forward defensive line was created on the Tersk ridge, which was subjected to repeated enemy air attacks. To disorient the enemy about the concentration of our main forces, 70 tank mock-ups were concentrated at Karbulakh station; these "tanks" were loaded at Groznyy and Sernovodsk stations. A false airfield with mock-ups of aircraft and refuelling vehicles operated near Groznyy. The enemy, deceived, subjected these areas to intense bombing.

"In the Black Sea group of forces, on the night of 13 December, the 8th Detached Engineer Battalion simulated the positioning of our troops southwest of Dva Brata hill. The combat engineers lit fires and created the noise of motors and vehicles. For 5 days the enemy tenaciously bombed this area from the air and shelled it with artillery and mortar fire."³⁵

On 3 February the commander of the Black Sea group ordered the landing of an amphibious assault force close to Novorossiysk, near Yuzhnaya Ozereyka and Stanichka, without awaiting the withdrawal of the left-flank units of the 47th Army toward the Markotkh Pass. It should be noted that the decision to land the assault forces at Novorossiysk had already been made in November 1942.

The main assault force, composed of three rifle brigades and one tank battalion, was to be landed near Yuzhnaya Ozereyka. To disorient the enemy and create the appearance of landing a large assault force on a wide front, diversionary assault forces were to be landed near Anapa, Blagoveshchenskoye, the Sukko River valley, and Cape Zheleznyy Rog, 25 kilometers south of Taman.

The composition of the diversionary assault force landed near Stanichka included an assault detachment of 250 soldiers under the command of Major Ts. L. Kunikov.

To conduct the diversionary assault, a landing detachment was created of four patrol cutters, two minesweeper cutters, two ZIS cutters, and a covering group of one patrol cutter and two torpedo cutters. The minesweeper *Skumbriya*, armed with rocket launchers, was included to reinforce the detachment's firepower. Senior Lieutenant N. I. Sipyagin was designated commander of the landing detachment for Stanichka.³⁶

The landing of the diversionary assault force was also supported by 2 groups of coastal artillery composed of 17 batteries of 45mm to 152mm mortars and 6 batteries of 120mm mortars.³⁷

Preparation of the assault operation near Yuzhnaya Ozereyka and Stanichka began in January 1943, at the same time as preparation for the offensive operation on the Krasnodar axis.

Reconnaissance of the enemy was conducted on a wide front from Novorossiysk to the Taman peninsula. This was done to conceal the landing areas from the enemy.

Despite the heroic efforts of the soldiers and officers, noted Marshal of the Soviet Union A. A. Grechko, the main assault operation near Yuzhnaya Ozereyka failed. The enemy, concealed in natural features, was not neutralized and managed to bring up its reserves. The enemy had built a large number of fire positions in probable landing places of our assault forces, but our reconnaissance did not reveal these fire positions in advance.

Stormy weather, poor leadership by the front commander, and other reasons can be included among the reasons for the failures.³⁸

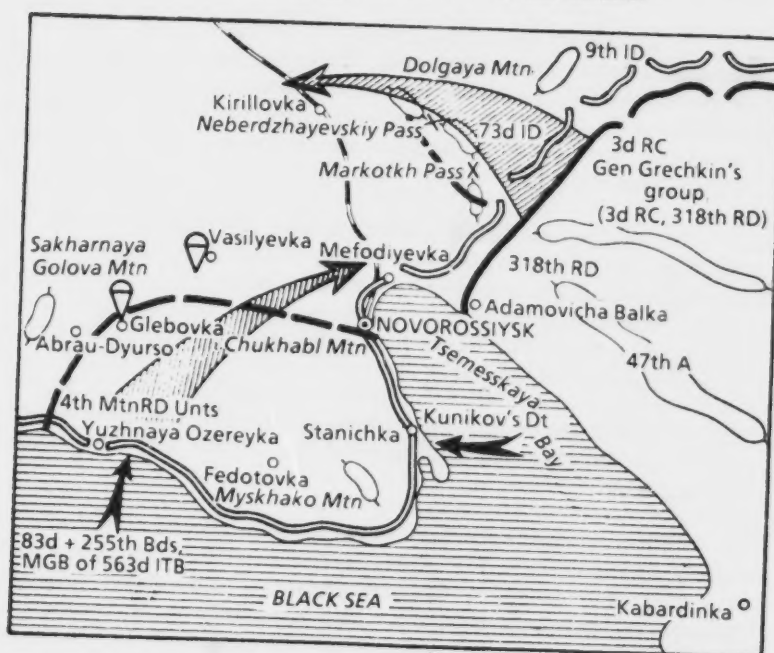


Figure 3. Novorossiysk operation plan.

Events developed differently in the landing area of the diversionary assault force near Stanichka. The success of this force was ensured by the surprise of the landing and the determination of the assault forces, the

coordination between the marines and the ground units, timely artillery support, the high moral and political state of the assault forces, and the firm command and control over the units.

Seizing and holding the bridgehead at Malaya Zemlya contributed to the liberation of Novorossiysk.

The Novorossiysk operation was conducted from 9 through 16 September 1943. Operational camouflage of the troops contributed greatly to the success of this operation.

General I. Ye. Petrov, the commander of the Northern Caucasus Front, categorically forbid any correspondence about the coming assault operation in Novorossiysk. All questions were decided only during personal meetings of the appropriate commanders and staff members. Documents were recopied by hand, and personnel were acquainted only with what directly concerned them.

Preparation of the operation was carried out under the pretense of preparing for the landing of a force at Yuzhnaya Ozereyka, southwest of Novorossiysk. The front staff published a special directive on conducting a landing operation in this area. In the preparation period, reconnaissance of the Yuzhnaya Ozereyka seacoast was intensified.³⁹

Our reconnaissance groups were landed here repeatedly. On 13 August, the command conducted a war game on the vessels of the Black Sea Fleet, in which problems of landing an operational assault force on the coast of the Crimea were worked out. Regrouping and concentration of troops and vessels were to be conducted only at night. By day, everything was to be carefully camouflaged and Gelendzhik Bay was to be reliably covered from enemy air reconnaissance.⁴⁰

To disorient the fascist German command, the 56th and 9th armies conducted their own operations to improve their tactical position. They focused the enemy's attention on the central and northern sectors of the Blue Line. The Transcaucasus and Northern Caucasus fronts were the first to widely carry out measures to disorient the enemy through the operations of ground forces working jointly with the Black Sea Fleet.

* * *

Camouflage of the troops of the Voronezh Front played a large role in the Ostrogozhsk-Rossoshansk operation. From 7 through 20 December, by order of the front staff, General K. S. Moskalenko's 40th Army was to simulate the concentration of troops and preparation for going over to the

offensive from the Storozhev bridgehead toward Korotoyaka and from near the Svoboda railroad station.

In executing their mission, the troops of the army created the appearance of making gaps through wire obstacles; mining the area in the zone of the false breakthrough; building up large forces for an offensive; carrying out reconnaissance through the command staff; intensifying preparation of roads, and so on.⁴¹ Later events showed the enemy was deceived: the enemy began to fire on the troops of the army more frequently and intensely, increased observation of the Storozhev bridgehead, and did not withdraw formations and units from this sector of the front. As a result, the troops operating on the other axis successfully completed their operation, which was begun on 16 December 1942.

The 40th Army went over to the offensive on 12 January 1943 from the Storozhev bridgehead; the enemy was completely surprised. The operational camouflage conducted after 16 December contributed to the surprise. The enemy was deceived a second time. The enemy decided that the 40th Army would attack not from the Storozhev bridgehead, but near Voronezh, where the intense movement of troops and combat equipment had been feigned, supplementary ice crossings built on the Don, and so forth.

A reserve regiment, second echelons of the divisions, and army reserves took part in executing the plan of deception, which had been drawn up by the army staff. The troops had to repeatedly move to the front by day, and back at night, purposely feigning the concentration of large forces.

Because of this carefully executed operational camouflage, surprise was achieved, which contributed to the success of the operation.

Operational camouflage was also conducted successfully on a front scale.

"To conceal the plan of our operation and deceive the fascists," wrote Marshal of the Soviet Union F. I. Golikov, former commander of the Voronezh Front, "we conducted a series of measures. The plan of deception included false troop regroupings for weakened sectors; transport and unloading of repair tanks and mock-ups at railroad stations adjacent to passive sectors; massive large-scale feints of an approach to the forward edge of these sectors by false units and the conduct of false exercises with these units; a show of artillery reinforcement in these sectors through the wide use of "roving" guns, batteries, and divisions, including 152mm and 203mm guns and M-13 and M-20 rocket launchers; conduct of false reconnaissance; the "loss" of directives and leaflets with the missions of

the attack on Voronezh and Pavlovsk; active use of radios throughout the front zone; clearing of roads on false axes; movement in daylight of troop columns toward passive sectors, and so on.

Our purpose was to show the enemy that we were not only not weakening our passive defense sectors, but, just the opposite, were reinforcing them and were contemplating active operations here.

At the same time, we carefully camouflaged our assault groupings. Nearly all of the formations designated as part of the assault groups had to carry out difficult marches of 200 to 350 kilometers. In daylight, they used the roads leading to passive sectors of the coming offensive, and at night, they used roads that led to the real concentration areas. In this general flow there were also units not taking part in the offensive. They were used only for deception: by day they went to the forward edge; at night they returned. They did this several times.

To what has been said must be added that our weak forces, in the passive sectors, conducted diversionary offensive operations at a whole series of points. Thus, the 270th Rifle Division, on a 65-kilometer front, attacked the Alpine Corps at the same time as did the 3d Tank Army. Our subunits also conducted diversionary offensive operations from the direction of Liska station. All of this, taken together, made it possible for us to deceive the enemy once and for all about our intentions."⁴²

Thus, Brigadier General Gekano, the commander of the Italian 3d Alpine Division, admitted later: "We were badly informed, or rather we knew nothing about the Russian troops, their effective combat strength, and the quality of their defense. We did not assume that the Russians were preparing an offensive, and so we did not pay particular attention to these important matters."⁴³

* * *

The historic battle at Kursk was one of the most important and decisive events of the Great Patriotic War and of all World War II. The bitter battles to the south and north of Kursk lasted about 50 days. In this battle the enemy's last attempt to recover the lost strategic initiative and get revenge for Stalingrad failed. The Hitlerite command was forced to refrain once and for all from the offensive and go over to a strategic defense. It became evident to all that fascist Germany faced inevitable defeat.

The victory in the Kursk salient demonstrated before the whole world the increased might of the Armed Forces of the Soviet Union and the superiority of the Soviet art of war.

Operational camouflage of the troops played a large role in the successful conclusion of the Kursk battle. Unlike the battles at Moscow and Stalingrad, the battle at Kursk was conducted in a more favorable situation: we had the strategic initiative and troop superiority, as well as much time to prepare for the operation.

Supreme High Command General Headquarters, the General Staff, the front and army commanders, and the staffs took all measures to conceal preparation for the operation and deceive the enemy. With this purpose, various directives, orders, decrees, and instructions were sent to the troops. The experience of the Moscow and Stalingrad battles was studied, as were the *1942 Infantry Field Manual* and the *1943 Draft Field Service Regulations*, in which camouflage of the troops received much attention. The staffs of the Central, Voronezh, and Steppe fronts developed detailed plans of operational camouflage. They called for measures to ensure the secrecy of preparation for an operation, organization of a show of false concentration areas and preparation of the attack position, creation of false radio nets and communication centers, construction of false airfields and the concentration of false aviation groups on them, and dissemination of false rumors into the front zone and the enemy rear.

Special attention was given to camouflaging defensive works and reserves in the operational zone, to concealing all counterpreparation measures,^{*} and to camouflaging command posts and the command, control, and communications system.

Measures were taken to organize communications security. So not to give the enemy the opportunity to discover the force along the Severskiy Donets River, radios operated only on receive. Checking radio communications was conducted in the armies and corps by short radio signals sent for 10 to 15 seconds by the main radio net. Acknowledgement of the audibility of the radio signals received by the radios of subordinate staffs was sent by wire. Radio signals for each radio were changed daily. Frequency changes were carried out five times a month, and call signs were changed every day.⁴⁴

In June 1943, when formations of the 69th Army were to relieve units of the 7th Guards Army, the 7th Guards Army, to conceal the regrouping, completely handed over its radio operating data to the 69th Army.⁴⁵ Measures were also taken to secretly prepare the units and formations to repulse an enemy attack.

The staffs of the armies and corps addressed all correspondence on operational procedure to the chief of staff of the front, who, after opening it, determined where a new document was to be kept and who would be permitted to use it.

In June and July 1943 the enemy, preparing for the summer offensive, conducted intense air reconnaissance in our defensive zone to determine its weak areas and reveal troop concentration areas, bases, and airfields. This required front and army commanders to take measures to deceive the enemy. For this purpose, 220 different types of aircraft mock-ups and 829 tank mock-ups were manufactured on the Voronezh Front alone, under the leadership of General Yu. V. Bordzilovskiy, chief of the engineer troops.⁴⁶

Representatives of the front staff in the 2d Air Army conducted joint reconnaissance and selected sites for 15 false airfields. On these false airfields, 4 to 7 kilometers from the real ones, mock-ups of ground attack aircraft and fighters were installed, and false observation towers, aircraft shelters, vehicles, and antiaircraft guns were built.

The 5th Engineer and Mine Brigade of the High Command Reserve, under the command of Lieutenant Colonel Stolyarov, set up the aircraft mock-ups and built the false installations. The enemy was disoriented. Its aviation bombed the false airfields nine times.

Available materials—trees, brushwood, and earth—were used to set up mock-ups of tanks and guns. Preparation of a tank mock-up required about 160 meters of poles, 450 grams of 1.5mm wire, and 38 square meters of brushwood. A team of five men installed a mock-up in 30 minutes. The manufacture of a mock-up of a 76mm cannon required 17 meters of poles, about 4 square meters of brushwood, and 200 grams of twine or bast. Two soldiers assembled a mock-up in 10 minutes.

In false troop concentration areas, movement of vehicles and tanks was simulated and mock-ups were moved around. This intensified the appearance of preparing our units for an offensive.

In some armies a false forward edge was created in front of the first position. This was done to force the enemy to conduct artillery and air preparation in vain before the attack, thus reducing the defenders' loss of personnel and weapons and foiling the enemy attack.

The concentration of troops in the attack position, the regrouping of troops, and the assignment of combat sectors were conducted only at night. During the day, preparatory work was carried out: march routes were staked out, markers were put up, and guides were dispatched. At dawn, any movement ceased; movement of small groups and separate vehicles was permitted in exceptional cases.

Work on digging out and equipping fire positions was also carried out at night, 2 days before their occupation. Minefields were camouflaged to

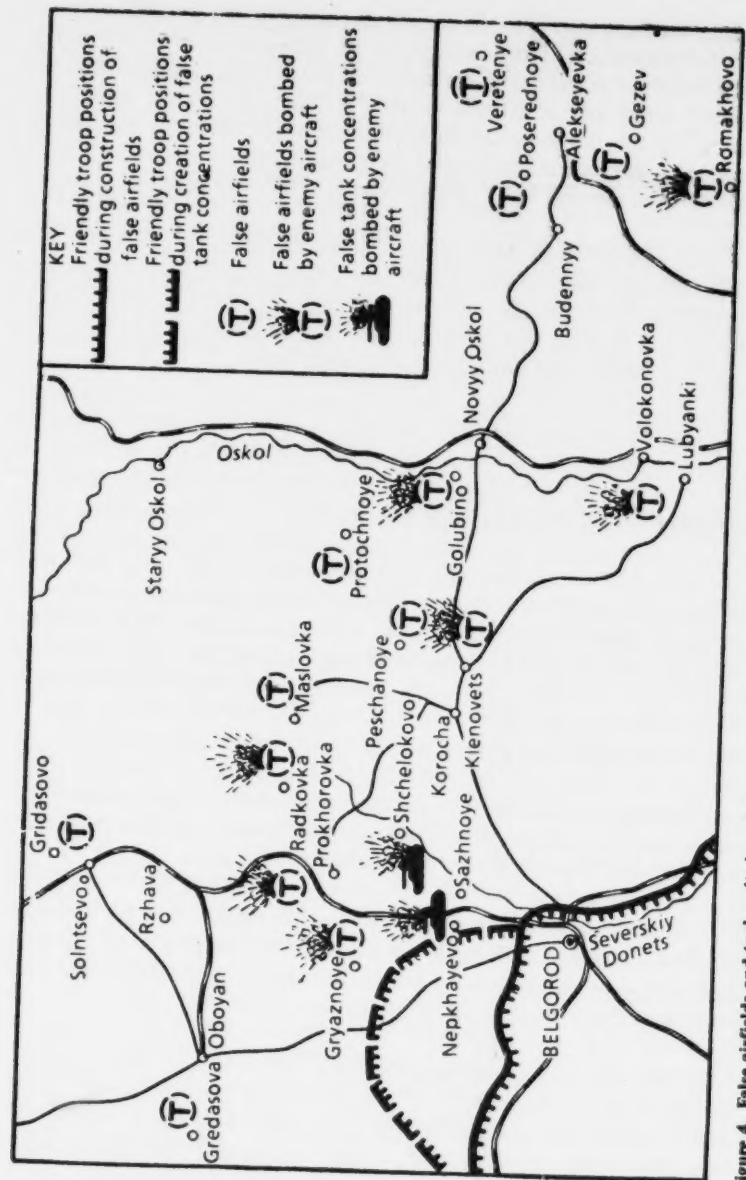
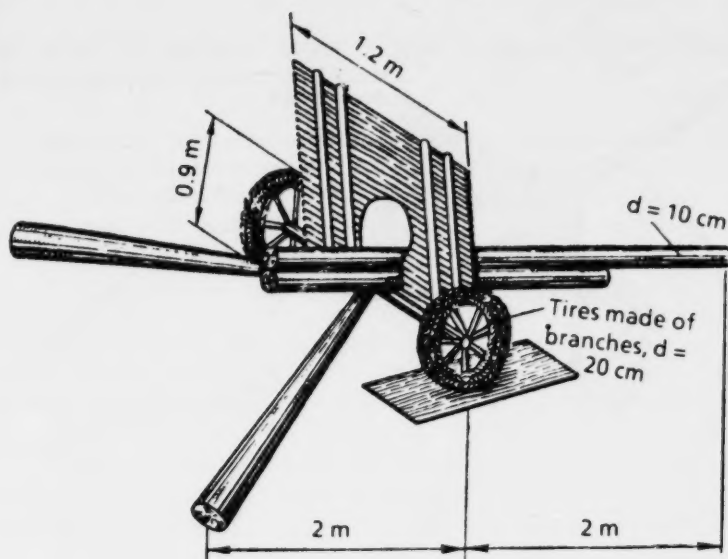


Figure 4. False airfields and tank units in a defensive zone of the Voronezh Front (June-July 1943).



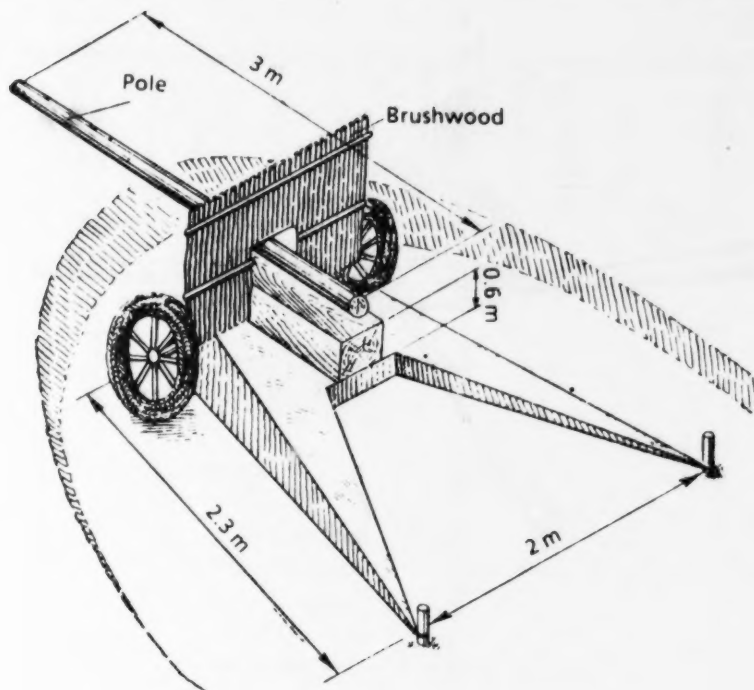
Drawing 1. Mock-up of a 45mm antitank gun.

match the terrain. Wire obstacles were installed at places with sufficient concealment: in tall weeds, brush, and between trees.

The combat equipment of armored and mechanized troops was placed in a dispersed manner, in direct proximity to structures whose shadows concealed the vehicles. At night, personnel were forbidden to switch on vehicle headlights, to light fires, and to use fire in general. The staffs designated their representatives to make sure blackouts were observed.

Signal personnel located telephone and telegraph centers in places hidden from observation—in populated areas, forests, and underground. Lines leading to the communications centers were run on pegs through specially dug trenches or ditches. The trenches were camouflaged to resemble the terrain. In areas where there were communications centers, people and vehicles were not permitted to concentrate.

Rail transport, as a rule, was carried out only at night or in bad weather, and trains were unloaded at the approaches to the stations. Army field depots were located in forests, ravines, and small populated areas that did not attract the attention of enemy air reconnaissance. Posts for regulating the flow of vehicle traffic were set out on access roads to the depots. In populated areas, screens of straw or reeds were set up at dwellings to camouflage vehicles.



Drawing 2. Mock-up of a 76mm gun.

Much attention was devoted to constructing false fieldworks. Thus, for example, in the 38th Army, 283 different false installations (55 bunkers, 92 fire trenches, 96 machine gun emplacements, 15 trenches for antitank weapons, and so on) were built.⁴⁷

Front and army commands paid special attention to camouflaging control posts. Thus, General P. I. Batov, commander of the 65th Army of the Central Front, by his order of 15 May 1943, forbid army staff personnel to receive at the command post officers arriving from the units, with the exception of division commanders, their deputies, and chiefs of staff of the formations. The heads of directorates and departments were required to have their representatives in a village close to a command post. The command posts were to decide all matters with persons summoned from the troops. In the area where a command post was located, movement of even small groups of people and all types of transport was forbidden during the day; at night, movement of vehicles with headlights on or of vehicles without special permits was not allowed.⁴⁸

In May 1943 the commander of the 6th Guards Army of the Voronezh Front, General I. M. Chistyakov, required subordinate units to set up a

regimental and divisional system of false observation posts in which well-instructed scouts were to be located.⁴⁹

Much work on camouflaging troop dispositions, defensive lines, and rear objectives was conducted in the Steppe Front, whose formations and units occupied the defensive line 200 to 250 kilometers from the line of direct contact with the enemy.

A 5 July 1943 directive from General I. S. Konev, commander of the front, noted that because the camouflage was underestimated and poorly adapted to the terrain, the enemy easily discerned the disposition of some of our troops' formations, staffs, depots, defensive lines, crossings, airfields, and other objectives, and subjected them to bombardment.

The troops rarely and unskillfully used false objectives to deceive the enemy and reduce the effectiveness of its bombing. Wherever due attention was given to camouflage, enemy air raids caused considerably less damage.

The directive required army and corps commanders to improve camouflage of the troops, defensive lines, various types of depots, and other important objectives of army significance. Detailed plans were to be developed for operational camouflage to deceive the enemy and conceal the true disposition of troops and major objectives. The plans called for camouflaging the troops in their places of permanent deployment; constructing false objectives, supply stations, various depots, and defensive lines; and preparing mock-ups of tanks, vehicles, and other equipment.

At the district regulating station and supply stations, plans were to be developed to withdraw transport under a threat of air attack and to control damage during the raids. False positions were to be set up and roving antiaircraft platoons and batteries were to be used to simulate air defense of the false objectives.

The commander of the front required that the camouflage be carried out rapidly.⁵⁰

Much attention was given to organizing and conducting reconnaissance of the area to determine the camouflage capacity of natural cover. Instructions from Colonel A. D. Tsirlin, chief of engineer troops of the Steppe Military District, of 18 May 1943, stated that the proper and competent use of natural cover (during billeting of troops) required establishing the number of troops that could be accommodated in this cover, that is, required determining camouflage capacity. To do this, reconnaissance had to be conducted.

The reconnaissance should determine the natural cover in the selected areas, the potential for accommodating troops in the natural cover, the presence of camouflage materials (type, quantity, and quality of material, its distance from roads, convenience of procurement and delivery to roads and concentration areas), and other specific features (number of populated areas, homes, inhabitants, and so forth).

Several reconnaissance groups were to be formed in each army. They included a representative of the engineer troops' staff (chief of the group), combined arms commanders, artillerymen, and tank troops.

The following standards were set forth in the instructions for determining the camouflage capacity of natural cover.

Ten to 15 men could be accommodated in each home in a rural populated area; 2,500 men or up to 800 horsemen per square kilometer in a forest of average density or in tall brush; 1 tank (or vehicle, gun, or two-horse wagon with horses) in the yard of a dwelling; and up to 300 tanks (or vehicles, guns, or wagons) per square kilometer of forest.⁵¹

At the height of the fascist German offensive north of Belgorod the command of the Voronezh Front assigned the staff of the engineer troops the mission of simulating the disposition of tank troops near Sazhnoye—from where formations of the 2d Guards Tank Corps had withdrawn to another sector of the front—to convince the enemy that there was no change in the corps' deployment. Execution of this mission was charged to Captain Kiselev, the representative of the staff of the engineer troops, at whose disposal was placed a team of combat engineers (35 men) from the 5th Engineer and Mine Brigade. On 9–12 July, 105 mock-ups (74 T-34s and 31 T-70s) were installed.

No special means were allocated to make the area appear real, and so tank tracks were made by hand by cutting sod to the width of a track. Mock-ups were installed at the edges of small forests, and fires were lit day and night in the depths of the forests. When enemy aircraft appeared, the "tanks" standing on the roads were moved 100 to 200 meters forward or backward, and some of them (25 percent) were moved once a day. In the first 3 days enemy aircraft appeared three or four times a day over the false concentration, and early on 12 July, dropped 18 bombs. Later that morning, when the enemy, after breaking through our defense, outflanked the false concentration, work ceased: the enemy began intense shelling and bombing, and nearly all of the tank mock-ups were destroyed.

Enemy operations confirmed that enemy air reconnaissance had detected the accumulation of tank mock-ups and taken them for real ones. By this time the 2d Guards Tank Corps had moved out 20 to 30 kilometers

from this area.⁵² The enemy was deceived, and the attack of the tank corps in the other sector of the front proved a surprise.

Thus, the operational camouflage carried out in the fronts and armies had positive results. The fascist German command was unable to discover the composition and grouping of the Soviet troops in the Kursk salient. The powerful attacks of the enemy ground forces did not achieve the desired results. Camouflage did much to reduce losses in our units and formations.

That the Hitlerite command did not see through the operational camouflage is indicated by the statements of the German generals. "We knew too little before the start of the offensive about the Russians' reinforcements in this area," (Oboyan and Korocha-V. M.) wrote General G. Schmidt, the commander of the 19th Tank Division. "We did not assume that there was even one-fourth of what we had to encounter. . . ."⁵³ General F. Mellenthin, analyzing the Citadel operation, observed: "The breakthrough of the Russian positions, covered by large minefields, at the start of the offensive proved more difficult for us than we had assumed. The horrible counterattacks, in which huge masses of men and equipment took part, were an unpleasant surprise for us too. . . . I must emphasize again the extreme cleverness of the Russians' camouflage. We did not manage to detect even one minefield or antitank area until the first tank was blown up by a mine, or the first Russian antitank gun opened fire."⁵⁴

The experience of the defensive battles at Kursk showed that the successful operations of the troops depended greatly on purposeful, careful, and extensive operational camouflage conducted in a timely manner.

Camouflage reconnaissance should be conducted when making the combat or operation plan.

For the secret disposition of troops and staffs, it is advisable to use small spurs and gullies, and not the main channels of ravines and gorges, because the latter are well marked against the terrain and on maps and, consequently, attract the attention of enemy air reconnaissance most of all. Good camouflage can also be achieved on a plain with a dense grassy cover and no prominent reference points. In all cases, personnel should be in shelters, dugouts, or slit trenches, carefully camouflaged to match the surrounding terrain.

The advance construction of defensive lines and various fortifications requires that they be camouflaged without delay, depending on the time available and taking into account terrain, the time of year, and the weather.

Even the simplest camouflage (turfing, sowing, additional planting of vegetation, and so on), when personnel strictly observe camouflage discipline, makes it possible to conceal troop operations from enemy observation.

Effective camouflage includes the creation of false concentration areas for troops and equipment, the construction of artillery and mortar positions, defensive lines, and airfields, and the simulation of movement by units and formations.

In addition, great care must be taken in preparing all false objectives and in skillfully making them appear real. If they are detected by the enemy, their location must be changed.

The experience of the defensive battles at Kursk showed that the command of the fronts and armies used aviation insufficiently to control camouflage of the troops.

* * *

Operational camouflage rose to a qualitatively new stage in the Soviet troops' counteroffensive at Kursk.

As early as 13 February 1943 the staff of the Red Army's engineer troops published a directive on conducting more careful camouflage of the troops during preparation and execution of offensive operations. On 10 May the staff proposed to the Central, Voronezh, and Steppe fronts that staff war games be conducted on this matter, and that army commanders, their staffs, and the commanders of the branches of troops take part.⁵⁵

Preparing for the coming offensive, the staffs of the fronts and armies developed operational camouflage plans. Each plan stated the overall goal; camouflage measures; men and equipment to carry out the camouflage; times of execution; and who, when, and how to check execution of the plan.

To conceal the troops in their concentration areas, all armies used natural screens (houses, buildings, forests, terrain, and so on), organic and local material, and artificial screens, and strictly observed the rules of camouflage discipline. Along with this, false disposition and concentration areas were created and various mock-ups and installations were built.

When troops were located in populated areas, soldiers were not permitted to congregate, especially near kitchens, mess halls, and staffs. Movement of a formation was permitted only at night.

In all buildings occupied by personnel, the windows were covered with plywood, thick dark paper, or newspaper glued to form four layers. The arrival and disposition of the troops in a populated area was carried out mainly after dark.

Fortifications, especially antiaircraft artillery positions, were carefully camouflaged from air observation.

In forests, the troops were usually positioned along roads and forest paths. Their equipment was sheltered under the crowns of trees and camouflaged additionally by individual means and local materials.

No fewer than 3 false tank concentration areas (up to a battalion each) were set up in each corps; there were 10 false artillery positions in a division.⁵⁶

To simulate railroad transport, empty boxcars and flatcars were left in some sectors. Troops moved on dirt roads at night and in poor visibility, and, when absolutely necessary, in daylight, but only in a dispersed manner in small subunits.

Twenty-two underwater bridges (their upper structure was 20 to 30 centimeters beneath the surface of the water) were built on the Severskiy Donets and Oskol rivers. This concealed the bridges from enemy observation. Crossings were also camouflaged by simulating their destruction. Pontoon bridges were raised in the daytime and sheltered along the shore.

False bridges and crossings were built in great numbers. Of the eight false bridges built across the Severskiy Donets, four were repeatedly subjected to artillery fire. Simulation of work on rebuilding destroyed bridges by putting dummies on them, which were periodically moved, also forced the enemy to expend ammunition in vain.⁵⁷

At the command posts the staff departments and directorates were dispersed as much as possible in a few populated areas. Supply of the staffs, which was linked with motor transport, was carried out at night and in poor visibility. Transport was reduced to a minimum and permitted only on certain roads or streets. All installations (dugouts, shelters, and so on) at command posts in populated areas were made to blend in with yards and personal garden plots. Command posts in gullies and ravines were camouflaged by covering a ravine with nets that had local camouflage materials woven into them to imitate the terrain.

Telephone and telegraph lines were laid along the shady sides of streets, in ravines, under bushes, and, when possible, were buried in the ground.

The wide use of smoke not only contributed to the successful execution of combat missions, but also considerably reduced losses in men and equipment. Thus, for example, on 17 July, during a crossing of the Severskiy Donets near Belaya Gora by the 279th Rifle Division, smoke screens were placed at three points to cover the crossing of the subunits from enemy observation on the opposite shore, to blind enemy weapon emplacements, and to make possible the approach of the assault groups to grenade range. At two other points smoke screens were used to distract the Hitlerites' fire from the real crossing.

The enemy opened intense artillery, mortar, and machine gun fire on the entire smoke screen. However, under cover of the smoke, the units of the division successfully crossed the Severskiy Donets and consolidated on the west bank with minor losses.

During the crossing of the Severskiy Donets by the 61st Guards Rifle Division on 17 July near Prishib, a smoke screen was raised on a 200-meter front (for 2 hours) to fill the river with smoke and create the appearance of crossing its bend from the flanks.

The enemy opened intense artillery, mortar, and machine gun fire against the smoke screen (in 2 hours about 800 mortar shells and projectiles were expended), but conducted only minor fire on the real crossing point. The division successfully crossed the river and consolidated on its right bank.

A camouflage operation, simulating the concentration of combined arms and tank armies, played a large role in successfully carrying out the counteroffensive on the Belgorod-Kharkov axis. The camouflage was conducted by the headquarters of the Voronezh Front in the zone of the 38th Army and near Snagost, Belovody, and Sudzha. The main attack was made on the left wing of the front by the forces of two combined arms armies and two tank armies in the general direction of Bogodukhov.

The engineer units were assigned the mission of using local materials to build 215 collapsible artillery mock-ups (eighty 76mm, eighty-eight 122mm, forty-four 152mm, and three 203mm). The engineer units were also to install 250 tank mock-ups (130 T-34 and 120 T-70), brought by rail to Lokinskaya station, and to make the concentration areas and unloading stations appear real.

The simulation of the concentration of units and formations of the combined arms army was carried out by two regiments of the 340th Rifle Division. Together with the artillery under their command, and according to plan, they conducted daylight marches to the false concentration areas,

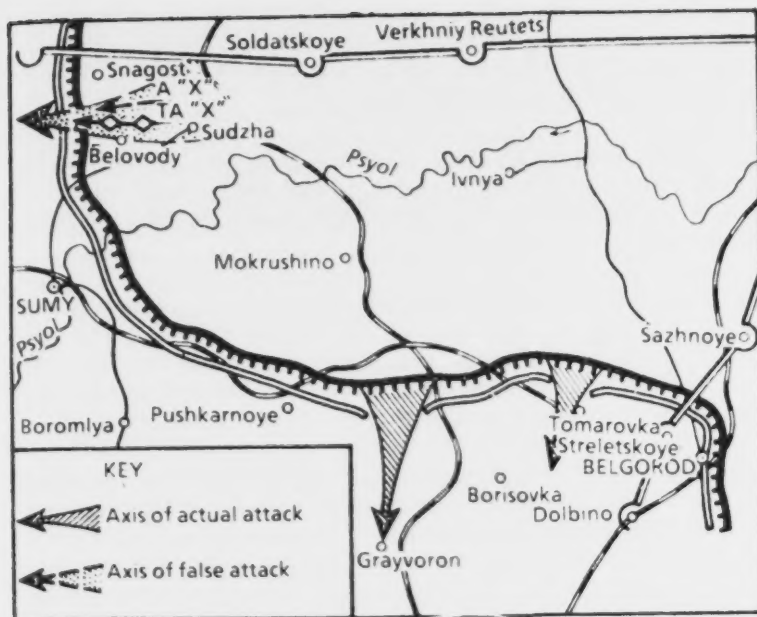


Figure 5. Plan for operational camouflage of the troops on the Voronezh Front (28 July-6 August 1943).

where they stopped to rest and to dig emplacements and trenches. At night the subunits returned to their attack positions.

In addition, a military transport branch under the staff of the 38th Army allocated a special train that arrived daily at Lokinskaya station and returned to Derevenka station at night. There were anti-aircraft machine guns on the train; during air raids, their crews opened fire on the enemy aircraft. Ammunition boxes were unloaded at Lokinskaya station, stacked along the railway, and not camouflaged. An echelon with tank mock-ups was unloaded at the same place, and the mock-ups were moved on vehicles.

When enemy aircraft appeared on the horizon and there were no trains at the station, camouflage specialists of the 22d Detached Camouflage Company raised a smoke screen to conceal important cargos.⁵⁸

Artillery mock-ups and dummy soldiers were made by combat engineers of the 268th Detached Army Engineer Battalion and the 32d Detached Engineer and Mine Company. One hundred and eighty men took part. They were led by Captain Tsitsishvili, the commander of the 268th Detached Army Engineer Battalion.

Four groups prepared parts for gun mock-ups of a certain caliber, and a fifth prepared the dummies. Each combat engineer in the group worked

on a single part. The mock-ups were brought to their installation point unassembled in vehicles. Such organization of the work made it possible to achieve high labor productivity and to finish the work on time. The tank mock-ups arrived by rail in ready form.

After installation, the false tanks and guns were camouflaged to conceal all parts that were poorly reproduced and so could betray the falseness of the objective. The "guns" were usually placed in prepared emplacements.

Enemy bomber and reconnaissance aviation made 244 flights and dropped 120 tons of bombs near the false concentration area, while our troops, moving out for an attack, were hardly subjected to air attack. The Hitlerites transferred two divisions (7th Tank and 7th Infantry) into the zone of the 38th Army (that is, in the direction of the false attack).⁵⁹

Consequently, enemy reconnaissance was deceived and the fascist German command was disoriented about the grouping of our troops and about our real intentions. The advance of the Red Army on Belgorod was unexpected for the enemy. Not until 5 August, when our troops had already broken through the enemy defense near Tomarovka, did the Hitlerites transfer their aviation there. But it was already too late. Favorable conditions had been created for the Soviet troops to complete the defeat of the enemy.

Supreme High Command General Headquarters' conduct of active troop operations in other sectors of the Soviet-German Front was important for the counteroffensive in the Kursk salient. In mid-August eight of our fronts operated simultaneously. This scattered the enemy forces, and the enemy could not thwart the counteroffensive of the Soviet troops at Kursk.

Thus, by conducting operational camouflage during preparation of the counteroffensive, the Soviet command managed to give the enemy a false picture of our forces, intentions, and plans. "The force and, most of all, the penetrative might of the Russian counteroffensive begun on 12 July in the northern and eastern sectors of the Orlov salient proved a cruel surprise for us. . . . In essence, it was incomprehensible that the Russians proved capable of carrying out an offensive in the summer, especially with such success,"⁶⁰ wrote H. Hakenholtz, a former staff officer of Army Group Center.

" . . . We in no way expected," said Field Marshal Keitel, "that the Red Army was not only prepared to repel our attack, but also had sufficient reserves to go over to a powerful counteroffensive."⁶¹

The effectiveness of our camouflage was affirmed by a series of enemy documents. Thus, the 1 July 1943 report "The Evaluation of the Situation at the Front of Army Groups South and Center," compiled by the eastern armies studies branch under the general staff of the ground forces of the German army, noted: "In recent months the Red Army has gone to even greater lengths to camouflage its radio communications. After the first of this year, when it was already impossible to determine formation numbers from secret Russian radio transmissions, even greater limitation of radio transmissions has taken place for some time, especially of transmissions by mobile formations in reserve. . . . It is now impossible to establish permanent changes in the enemy situation."⁶²

Even the reconnaissance in force conducted under order of General Headquarters by the troops of the Western and Bryansk fronts did not make the fascist German command apprehensive. The enemy saw it as an unsuccessful attempt to find out the strength of the German defense, and so enemy vigilance was dulled. In Hitler's headquarters, the actions of the forward battalions were seen as individual holding operations, directed at "keeping the reserves in the Orlov salient from entering the offensive against Kursk."⁶³

The experience of the Soviet troops' counteroffensive showed that the success of an operation depends greatly on its secret preparation. The aim of an operation has to be kept secret, the enemy must be deceived about the coming operations of friendly troops, and regroupings and concentrations of units and formations must be conducted secretly.

All operational camouflage should follow from the aim of the operation and be an integral part of the front or army commander's plan and of the operation plan.

During organization of the offensive, each commander should have a carefully conceived plan for camouflage and for deception of the enemy. The means and methods of deceiving the enemy should be varied and should demonstrate resourcefulness.

To show a false concentration area of a rifle division and tank corps, as experience has shown, it is advisable to allocate rifle and tank companies, an artillery battery, dozens of vehicles, 20 to 30 gun mock-ups, 60 to 80 vehicle mock-ups, and 10 to 12 field kitchen mock-ups.

The approach of troops, occupation of the attack position, and deployment of artillery should be conducted at night, with the observance of strict blackout and sound masking.

In sectors of the front far from the axis of the main attack, the false approach of troops, operation of radios, and patrol of reconnaissance

groups must be organized, false batteries must be built, vehicle mock-ups must be installed, tracks of new roads must be laid, and the concentration of tanks and intensified air reconnaissance must be simulated.

* * *

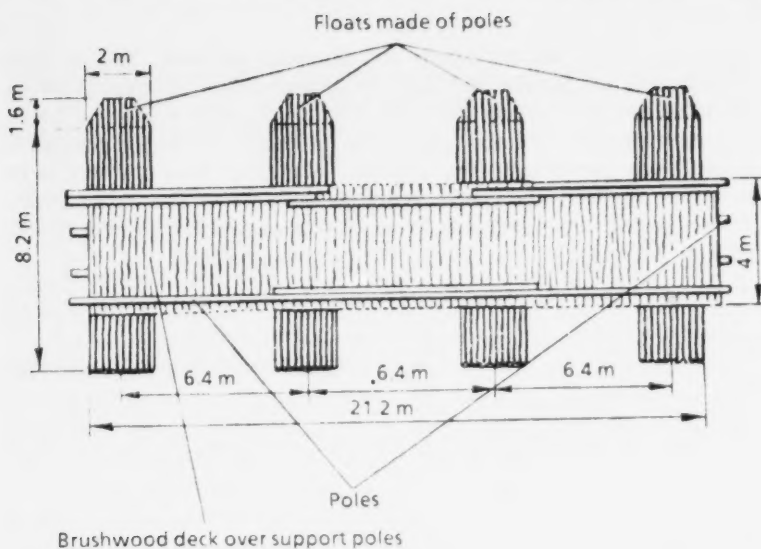
The defeat of the fascist German troops at the Kursk salient changed the correlation of forces on the Soviet-German Front even more in favor of the Soviet Armed Forces.

The Hitlerite high command was forced to go over to the defensive on all fronts. The fascist leadership tried to hold the Ukraine, especially the Don Basin, by any means. "The abandonment of the Don Basin and central Ukraine," emphasized Keitel, "would mean the loss of extremely important airfields, and great losses in food products, coal, power resources, and raw materials."⁶⁴ The greatest importance was attached to mighty fortifications on the high right bank of the Dnepr, which, in the opinion of the Hitlerites, had to become an insurmountable barrier for the Soviet troops.

But nothing could halt the powerful charge of the Soviet Armed Forces any longer. Armed with new combat equipment, sent to the front in a constant stream by the workers in the rear, the Soviet Army drove the enemy steadily west.

At the end of September 1943 the troops of the Central, Voronezh, Steppe, and Southwestern fronts, pursuing the withdrawing enemy, moved toward the Dnepr on a wide front. The need to rapidly cross the Dnepr with the smallest losses required wide use of camouflage. The fronts were given the necessary instructions. Thus, for example, Colonel A. D. Tsirlin, chief of the engineer troops of the Steppe Front, required the chiefs of the engineer troops of the 5th Guards and 37th and 53d armies to take a direct part in developing camouflage for the troops and crossings during the crossing of the Dnepr. At least one false crossing was to be built in each division. Near the crossings, true concentrations of troops and crossing equipment were to be carefully concealed, and false ones simultaneously created. Combat engineer and rifle platoons were to be allocated to a false crossing for camouflage operations, and they were to be provided with crossing equipment and transport. Together with the chiefs of the chemical departments, they were to lay smoke screens to conceal the real crossings. Radios, artillery, and tanks were to be used to simulate sounds and noises.

The staff of the engineer troops of the Steppe Front (chief of staff, Lieutenant Colonel Pisarzhevskiy) recommended in the instructions that the troops set up false crossings at the same time as the real ones, and that



Drawing 3. False bridge.

sometimes false crossings be set up somewhat earlier to distract the enemy's attention and fire.

When the area for a river crossing was simulated, assault, ferry, and bridge crossings were to be constructed. The building of a false bridge crossing over a wide river was to be limited to preparation for its construction. For an assault crossing, false attack positions, crossing equipment concentration points, initial lines, and lines of embarkation were to be created, vertical screens installed, smoke screens used, and false antiaircraft artillery fire positions equipped. In the attack position, mock-ups of soldiers and guns were to be installed, and movement of small subunits and vehicles was to be organized to make the position appear real.

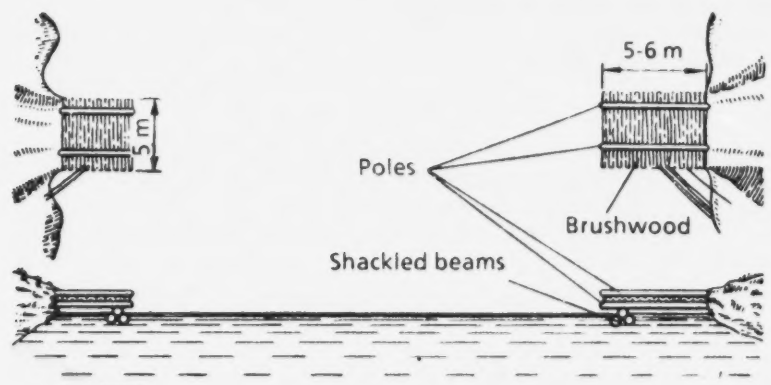
The simulation of an assault crossing was to begin with the creation of noise indicating the approach of units to the crossing. The noises were to be kept up for 2 or 3 days, using radio equipment, vehicles, and other types of transport for this. The false assault crossing of the troops was to begin at night, in fog, or under cover of a smoke screen after conducting all preparations.

At a false ferry crossing, the massing of troops in the initial concentration area was to be shown, the banks were to be prepared for the crossing, vertical screens and smoke screens were to be set up, and the covering of the crossing with antiaircraft artillery was to be feigned.

To simulate a ferry crossing on cables, it was recommended to assemble one or two ferries from local or organic resources and install

mock-ups of combat equipment and dummies on them. Two or three soldiers were to take the ferries to the opposite bank. There, the ferries would be unloaded or the mock-ups rearranged on them. After a ferry's return, mock-ups of combat equipment or small subunits (or groups) of soldiers were moved to it from the initial line. The mock-ups were to be loaded on the ferry and carried to the opposite bank. The ferry crossing was to operate in this sequence for several days in accord with the troops' crossing plan.

The laying of a false bridge was to be carried out after conducting all preparations. For this purpose, supports were built from poles, and one or two intermediate trestle supports were installed. Panels and other materials were stacked on the supports, forming the upper structure of the bridge. The bridge was to be built slowly, occasionally allowing the supports to tear away from their anchors and be carried off by the current.



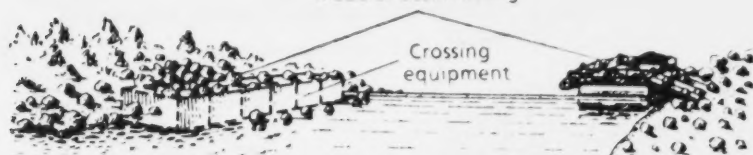
Drawing 4. False pier.

False crossings were to be organized under instructions from division commanders and higher-ranking officers. A formation commander was required to set up dispositions and a number of false crossings and to designate crossing control officers. According to the staff instructions of the front's engineer troops, the control officer was responsible for the camouflage of the real crossing and for the condition of the false one. The control officer was not to permit open disposition and concentration of people and motor transport near the crossing. He also had to oversee blackout discipline, use his personnel to renew screens and mock-ups that had fallen into disrepair, and, when enemy aircraft appeared, give the command to set up a smoke screen over the real and false crossings.

To make a false crossing appear real, the control officer was made responsible for moving vehicle mock-ups on the road to the crossing on

both banks. He was also to simulate the addition of false bridge sections and their camouflage, periodically send groups of vehicles to the false crossings, and return them to the real crossing.⁶⁵

Piled rocks and false rocks
made of bast matting



Drawing 5. Crossing equipment camouflaged as rocky shoreline.

The troops of the Steppe Front successfully camouflaged the crossing zones over the Dnepr in the sector of Deriyevka and Ulyanovka.

Formations of the 7th Guards Army (commander, General M. S. Shumilov) were some of the first in the Steppe Front to cross the Dnepr. On the night of 25 September, approaching the river secretly, they began to cross to its right bank near Mishurin Rog and Domotkan. By morning, several regiments were already engaged in battle to expand the captured small bridgeheads. The crossing lasted several days.⁶⁶

Branches over decking



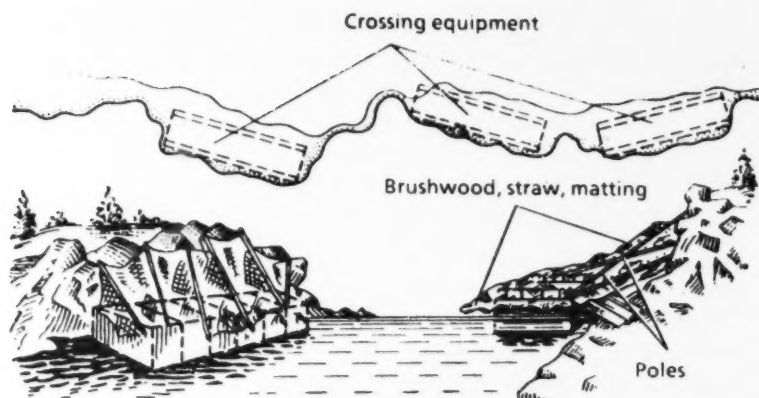
Branches in spaces in decking

Drawing 6. Crossing equipment camouflaged as bushes.

Here, because of a lack of men and equipment, the camouflage at the crossings was limited: in daylight, the floating section of the bridge was covered, separate sections of the crossing were covered with smoke, the lowering of crossing equipment into the water was simulated in the zone of enemy observation, and crossing objectives were dispersed over a large area behind natural screens.

Each of these measures had a positive result. Thus, the false lowering into the water of the pontoons on the eastern part of Borodayevskiy Island successfully forced the enemy to conduct artillery fire on an empty site for several days. At this same time, the crossing was being carried out at night in a different area, which the Hitlerites didn't even suspect.

Operational camouflage of the troops was conducted successfully in the 5th Guards Army (commander, General A. S. Zhadov). After creating



Drawing 7. Crossing equipment camouflaged as steep shoreline.

the impression of preparing to cross the Dnepr near Kremenchug by concentrating artillery and mortar fire of all types and by deliberately poorly camouflaging the crossing equipment, the troops put ashore at night on the part of the islands near Vlasovka.⁶⁷

To camouflage the transfer of the army's artillery to Ozery and Mikhaylenka, the march was carried out only in darkness, on roads that prevented enemy ground observation. Strict camouflage discipline ensured concealment from air observation. The return of the transport to transfer the equipment was carried out in the daytime with second and third trips by different routes. To conceal the withdrawal of the main artillery forces from near Kremenchug, one or two batteries from each regiment remained for 1 or 2 days in their previous fire positions and periodically opened fire.

The crossing of the artillery to the right bank of the Dnepr near Deriyevka and Mishurin Rog was carried out at night over a pontoon bridge. At dawn, the bridge was raised and camouflaged in the brush along the bank. At the same time, 3 to 4 kilometers downstream, a pile bridge was built in an open place. The enemy discovered the bridge and subjected it to concentrated bombardment. Thus, the enemy did not succeed in discovering the true crossing point; on 10-13 October, the army's artillery was concentrated in its designated area.

During the Dnepr crossing the 57th Army built three false crossings: one near Domotkan on the army's right flank, and two near Mursin Island (south of Pankovka). They distracted the Hitlerites' attention from the real crossing.⁶⁸

In the Steppe Front, the transfer of troops was carried out at night over three floating bridges. During the day, the bridges were raised, and the ferries were moored to the banks and camouflaged with branches and reeds. Part of the decking of the trestlework was disassembled, and the material piled at the site, creating the impression of a broken section of bridge.

In addition, 7 kilometers of approaches to the crossings were camouflaged. Used for this were vertical screen-fences with branches, which simulated brush. They were removed during operation of the crossing. An area of 1,200 square meters was covered with vertical screens, and 2,500 square meters with overhead screens.⁶⁹

The approaches to the crossings were camouflaged by sprinkling sand, scattering brushwood, and simulating craters from aerial bombs and shells. This made it possible to conceal some access paths completely, and to create the appearance that others had been deserted. By night, troops and cargo moved along these paths. Using this method, 2,500 linear meters of paths to crossings with an area of 5,000 square meters were camouflaged.

Smoke pots and hand grenades were widely used to cover the crossing areas with smoke.

Four false crossings were built to distract the Hitlerites' attention from the real crossings. Thus, near Perevolochnaya, the trestlework of an unfinished bridge was used for this. The enemy subjected it to bombing and shelled it daily with artillery and mortar fire for 2 weeks. Near Mishurin Rog, two false ferry crossings and one false bridge were built over a branch of the river. Two false floating bridges, with the raised false floating section moored to the banks, were built near Soloshino. When enemy aircraft appeared, the crossings were covered by smoke screens.

The 25th Detached Bridge Company and several teams of the 1st Detached Engineer Bridge Brigade camouflaged the real crossings and their approaches and built false bridges. The smoke screens over the crossings were laid by chemical protection units and subunits.⁷⁰

Because of these measures, there were no direct hits by aerial bombs and artillery shells on the bridges and ferries.

Some false bridges were destroyed repeatedly, while the real ones functioned without interruption at the same time.

The execution of the camouflage plan on the Voronezh Front (chief of front engineer troops, General Yu. V. Bordzilovskiy; chief of staff of

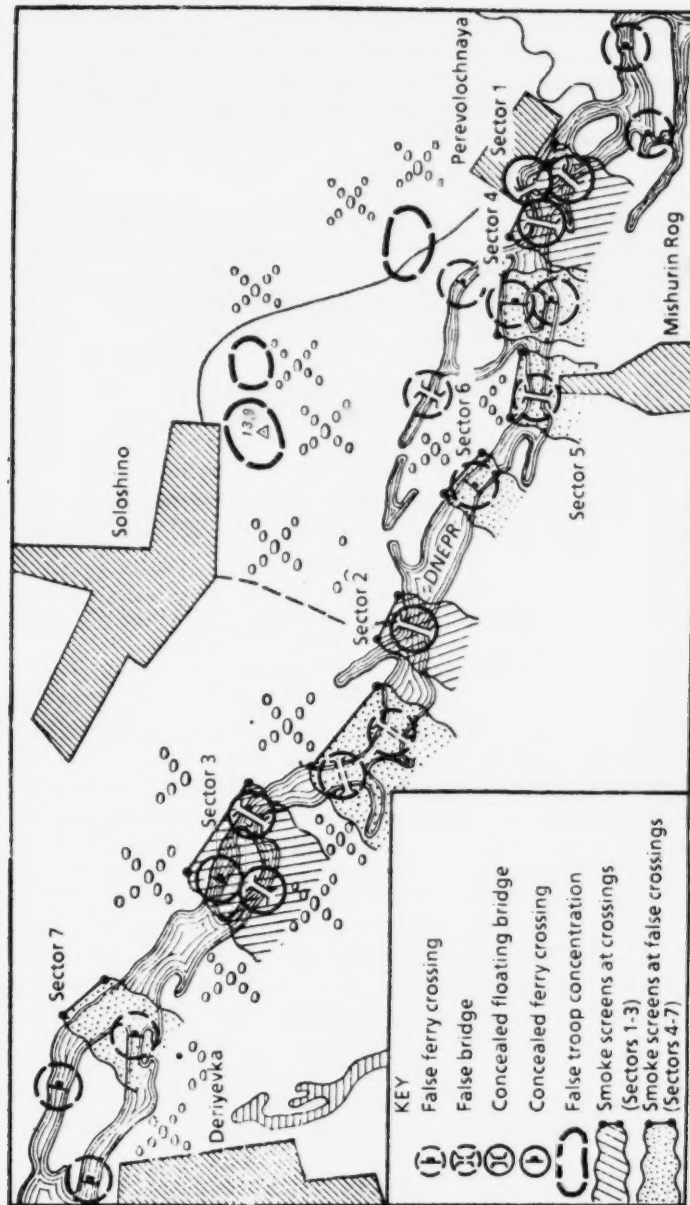


Figure 6. Crossing camouflage during forcing of the Dnepr by troops of the Steppe Front.

engineer troops, Colonel Slyunin) deserves attention. From 14 through 21 October 1943, the plan called for creating a false concentration of two tank corps, two rifle divisions, four artillery regiments, and two rocket artillery battalions, and then for simulating a crossing of the Dnepr. The plan was approved by the front military council at the beginning of October 1943 (appendix 3).⁷¹

Simulated regrouping of rifle and tank units was carried out along the Borispol-Vishenki and Borispol-Protsev march routes. Subunits specially allocated for this moved west by day and returned at night. One hundred fifty tank mock-ups were used to equip false tank concentrations near Vishenki and Protsev, and the area was made to appear real with actual tanks, smoke, and fires.

False artillery positions were set up near Gnedyne and Protsev; 100 mock-ups of guns and 5 mock-ups of rocket launchers were made to appear real with the use of smoke and roving guns.

Preparation for crossing the Dnepr was simulated near Urochishcha Khreshchate by building up stocks of lumber, bringing in crossing equipment, and laying smoke. An attempt was made to cross the river by laying real crossings under cover of smoke. A pontoon company, a chemical platoon, and a platoon of camouflaging specialists were allocated for this.⁷²

Deception of the enemy was conducted successfully in the armies of the front. In the zone of the 4th Guards Army on 24-25 October 1943, the approach and concentration of one rifle division was simulated near Chigirin and Dubrava, and another near Vlasovka, as was preparation for their crossing of the Dnepr toward Lake Podkobylok and Lake Yatskov. The deception was conducted under a plan approved by the army's commander, General I. V. Galanin, and military council member, General I. A. Gavrilov.

Movement of the troops to the concentration areas (from 0500 to 1500 hours) was conducted in groups (150 to 200 men) arranged double-file with increased distances between rows and groups. Short halts were made in open places after each 1 to 2 kilometers.

The troops were not camouflaged at the concentration points. Up to five false artillery batteries were established there. A radio maintained communications and sent several encoded and semi-plain radiograms. On the night of 25 October, 10 to 15 small fires were lit in each of the concentration areas, and several vehicles were placed at various locations on each of the roads from Pronozovka to the south and from Nedogarka to Vlasovka for periodic flickering of headlights.⁷³

Preparations were made to build two or three bridges across the Stari River. The transfer of boats was feigned by day. When the wind blew toward the enemy, the appearance of stockpiling wood was created. On the day of the offensive, intense fire was conducted with all types of weapons. Reconnaissance was conducted toward Voronovka and on Yatskov Island. All of this made it possible for the 4th Guards Army to execute its combat mission with minor losses.

Operational camouflage contributed to the successful crossing of the Dnepr by the troops of the Voronezh Front.

Camouflage of the Dnepr crossing was also widely conducted by the troops of the Southwestern Front. General I. T. Shlemin's 6th Army was the first to cross to the Dnepr's right bank south of Dnepropetrovsk. With the forces of two divisions, the army surmounted the water obstacle in a sector 8 to 10 kilometers south of Zaporozhye. At night, two regiments from each division crossed the river, seized a bridgehead, and later expanded it.

Such a result depended greatly on the complete surprise achieved by secretly concentrating troops and equipment, by feigning crossings of the Dnepr in other areas, by observing camouflage discipline in the subunits, and by organizing careful control over the camouflage.

Smoke support of the Dnepr crossing was carefully planned and successfully carried out on all fronts.

The purpose and location of the smoke screen, the expenditure of smoke, the readiness, and the figures responsible were explained in the smoke support plan of the operation of the Central Front's 65th Army for crossing the Sozh and Dnepr Rivers (appendix 4).⁷⁴

Smoke screens were laid in the army on a wide front. They covered the right bank of the Dnepr. The enemy was deprived of the opportunity to conduct aimed fire. The formations of the 65th Army crossed the river and seized a bridgehead on its west bank.⁷⁵ Enlisted for laying smoke were the detached chemical protection companies of the rifle divisions and a detached army motorized smoke battalion, which could maneuver rapidly and create controlled smoke for a prolonged period in large sectors.

After crossing the Dnepr, one of our troops' most important missions was to liberate Kiev. It was the intention of the Soviet command to destroy the enemy's Kiev force, and two attacks were proposed: the main one from the Bukrin bridgehead, and a secondary one from the Lyutezh bridgehead; these areas were south and north of Kiev. An assault grouping of the 1st Ukrainian Front twice attempted an offensive from the Bukrin bridgehead,

but was unsuccessful both times. The enemy had drawn up all the forces of its Kiev group and created a strong defense.

After assessing the situation, General Headquarters decided to make the main attack from the Lyutezh bridgehead in a southerly direction. To execute Headquarters' order, the command of the 1st Ukrainian Front had to regroup, secretly from the enemy, the 3d Guards Tank Army, the main part of the Supreme High Command Reserve artillery, and other troops, from the Bukrin to the Lyutezh bridgehead, a distance of 130 to 200 kilometers. The front published a false order on going over to the defense, and several copies of it were "lost": the Hitlerites, discovering this order, believed what it said.

"Careful camouflage was carried out," wrote Marshal of the Armored Troops P. S. Rybalko, the commander of the 3d Guards Tank Army, "to conceal the withdrawal of a tank formation from the Bukrin bridgehead and its transfer to a new concentration area. Formation control posts and several radios were left at the bridgehead. They all continued their normal work, deceiving the enemy. Wood and earth mock-ups were built to replace the tanks that had been removed from the occupied positions. Gun mock-ups were placed in the fire positions. The movement of tanks and vehicles toward the coming march was permitted only at night when a blackout was maintained. Strict camouflage was also conducted near the new concentration. Non-flying weather during our transfer helped to keep secret the preparations for the new offensive. We deceived the enemy with our measures, having forced enemy aircraft to bomb our abandoned positions for a week."⁷⁶

Smoke was used widely and successfully at the real and false crossings over the Dnepr. In October, the enemy dropped about a thousand high-explosive aerial bombs on the crossings covered with smoke in the zone of the 1st Ukrainian Front.

To hold the enemy's attention, troop activity was maintained at the Bukrin bridgehead, as were previous artillery fire schedules and the operation of radios. Other deception measures were carried out that convinced the fascist German command of preparations for a major offensive operation.

Rumors were widely spread about a switch to a rigid defense throughout the front and about preparations for an offensive from the Bukrin bridgehead that included a tank army. For this offensive, tank-unit billeting parties were dispatched to Kiev, Pereyaslav-Khmel'nitskiy, and adjacent populated areas, reconnaissance of the terrain was carried out at the forward edge, near Malyy Bukrin, and drills to prepare for an offensive with tanks were conducted in all rifle battalions.

In daylight, when enemy aircraft appeared, the movement of infantry and unit trains was feigned toward crossings along the routes Zarubentsy-Grigorovka; Zarubentsy-Malyi Bukrin; Traktomirov-Velikiy Bukrin. At night, increased movement of motor transport and tanks over the crossings to the front lines was feigned.

The rear subunit forces of the 206th and 309th rifle divisions built mock-ups of huts and dugouts in groves, ravines, and populated areas, showed a great quantity of smoke (with furnace fireboxes in dugouts), and lit fires at night in the concentration areas.

Near Velikiy Bukrin, Grigorovka, and Lukovitsa, division and army combat engineers installed mock-ups of tanks and artillery (at least a tank or artillery battalion at each point). Work continued in turns to show consistency of the concentration of the subunits. False ditches and communications trenches were dug; enemy wire obstacles were broken through to feign preparation of passages. False passages were also shown in our obstacles. Combined arms reconnaissance was begun, and reconnaissance in force was conducted in some sectors.⁷⁷

Deception of the enemy was conducted successfully north of Kiev in the zone of the 38th Army (commander, General K. S. Moskalenko; military council member, General A. A. Yepishev; chief of staff, General A. P. Pilipenko). On 15-18 October 1943, the military council, staff, and political department of the army, by conducting various measures, deceived the Hitlerite command about the location of the main attack against the enemy's Kiev force and focused enemy attention on a secondary sector.⁷⁸

Because of good organization in regrouping the troops, and because of operational camouflage in the armies operating on the main and secondary axes, the main forces of the 1st Ukrainian Front were concentrated in secret from the enemy at the Lyutezh bridgehead. The operation of the Soviet troops was successful.

During the battle for the Dnepr the Soviet Armed Forces inflicted serious losses against the enemy in men and equipment and prepared for the complete liberation of all of the Right-Bank Ukraine and for the entry into the western Ukraine and southern Poland. The richest agricultural areas of the Ukraine and the most important industrial and energy area of the country—the Don Basin—were returned to the Motherland.

The battle for the Dnepr showed once again the great role of operational camouflage of the troops in the successful conduct of an operation.

Combat experience has shown that, during the crossing of water obstacles, false crossings must be established, but so as not to make the enemy suspicious. To deceive the enemy, an increase in troop and antiaircraft artillery activity near the false crossings is desirable.

Smoke was used effectively during the Dnepr crossing. Our troops camouflaged 69 crossings. In October and November 1943 the enemy made more than 2,300 flights over the crossings, but only six bomb hits were noted on the crossings during the entire period.⁷⁹

During river crossings, it is advisable to put up smoke screens on a wide front for at least 2 to 3 hours. If the wind direction is unfavorable, artillery smoke projectiles and mortar shells should be used, as well as aircraft. Laying a smoke screen on a front of at least 2 to 3 kilometers creates more reliable and timely cover for crossings and railroad bridges. The objective of the camouflage should be not in the center of the smoke clouds, but on the flanks, to the front, or to the rear. At the same time that real objectives are camouflaged, false smoke screens must be created away from the camouflaged objectives.

Approaches to crossings must be covered with smoke without fail. Special attention should be paid to covering reference points near the objectives with smoke to deprive enemy aircraft of the opportunity to find the camouflaged objective.

In all camouflage of crossings with smoke, reliable communications and coordinated action must be organized between smoke personnel and the air observation, warning, and communications service and air defense units. This makes possible the laying of smoke screens in a timely manner and the coordination of smoke screening with antiaircraft artillery fire.

* * *

In the second period of the Great Patriotic War methods of operational camouflage underwent further improvement and development: from independent measures on deception of the enemy to the conduct of camouflage operations, and from independent instructions of commanders of field formations and branches of troops to the development of an operational camouflage plan and the creation of a special leadership staff. As a result, operational camouflage nearly always had great effect. The operations conducted were a surprise to the enemy, who did not have the opportunity to take large-scale countermeasures to thwart them.

However, operational camouflage was sometimes conducted unsuccessfully. Thus, preparations for the offensive in the Chernigov-Pripet offensive operation (August-September 1943) were not kept secret because

of carelessness in disorienting the enemy and poor support in keeping secret the regrouping of the troops. Hitlerite intelligence determined the concentration area of the main force of the troops of the Central Front. As a result, the fascist German command concentrated a large number of troops on the axis of the front's main attack (near Sevsk).

Notes

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Chapter 3. Operational Camouflage in the Offensive Operations of 1944

In 1944 operational camouflage of the troops underwent further development and was conducted in a more favorable situation than in 1941-1943. The strategic initiative was in the hands of the Soviet command, which had the opportunity to freely select the forms and methods of conducting the armed conflict.

Characteristic of operational camouflage in 1944 was its wide scope and great diversity: reconnaissance in force was conducted on a wide front and simultaneously in the zones of several fronts; active air operations were conducted in main and secondary sectors; offensive operations were prepared simultaneously on a number of strategic axes; a going over to the offensive was carried out first in a secondary sector; there was the concentrated use of smoke, and so on.

The 1943 *Draft Field Service Regulations* and the *Manual on Breaking Through a Static Defense*, published in the spring of 1944, played a large role in the conduct of operational and tactical camouflage. Taking into account the experience of preceding operations, these manuals gave recommendations on planning, conducting, supporting, and controlling operational camouflage. For example, the *Field Service Regulations* revealed the content of a plan for operational camouflage and proposed an outline of the following: camouflage missions through the stages of preparation and in separate periods of combat; camouflage measures; the time and place for executing camouflage measures; and the superiors responsible for these measures.

The regulations required that camouflage be carried out continuously by the troops. The commanders were obliged, in all combat, to conceal their units and subunits and to check the camouflage by scheduled ground and air observation and aerial photographs.¹

"The difficulties of keeping secret the concentration of great masses of troops in a breakthrough and accomplishing the great volume of engineering work for a breakthrough," stated the *Manual on Breaking Through a Static Defense*, "require reliable cover by combat aircraft and the most careful development of operational and tactical camouflage."²

The manual called for the wide use of smoke. "The main principle of using smoke during a breakthrough," it stated, "is its concentrated

employment on a wide front to disorient the enemy about the direction of the main attack and to blind enemy fire and observation systems."³

At the same time, a number of circumstances complicated and hampered the conduct of camouflage to a certain extent. These included the reduction of the front line and the precise determination not only of strategic and operational axes, but also of breakthrough sectors, since operations were often begun from limited bridgeheads seized during a river crossing; a considerable increase in the composition of the assault groupings, whose concealment presented great difficulty; the shift of operations beyond the borders of our Motherland, where the fascist German command had the opportunity to create a well-developed intelligence network.

Most instructive about operational camouflage in the period under discussion were the defeat of the Peterhof-Strelna force and the Belorussian, Lvov-Sandomierz, Jassy-Kishinev, and certain other operations.

During the destruction of the Peterhof-Strelna enemy force the operational camouflage carried out in the 2d Assault Army (commander, General I. I. Fedyuninskiy; chief of staff, General P. I. Kokorev) was of great importance. The army's offensive was prepared at the start of January 1944 at Leningrad from the Primorye bridgehead. The army's operational camouflage plan called for giving the enemy the idea that an operation was being prepared on the army's right flank (on the Koporye axis, in the sector of Kernovo and Florevitsy) so that the enemy would be forced to pull up its reserves and weapon systems there.*

For this purpose, a false concentration of infantry, artillery, and tanks was conducted near Smolnyy, Yelizavetino, and Lubanovo.†

Communications troops feigned the appearance of new formations and units on this axis. Night searches and reconnaissance in force with maximum forces were conducted throughout the front in the sector of Kernovo and Florevitsy. The day before the start of the operation, 13 January 1944, two reinforced battalions of the 196th Rifle Division made a daytime march to the army's right flank, and, on the night of 14 January, while observing all camouflage measures, they returned to the permanent deployment area. The artillery conducted false ranging fire.

Aircraft from General S. D. Rybalchenko's 13th Air Army conducted increased reconnaissance on the Koporye axis, bombed the enemy there, and simulated cover of the regrouping and concentration of our forces.‡

* Ministry of Defense Archives, f. 217, op. 33425, d. 32, l. 24. The army made its main attack on the Gostilits-Ropshin axis.

† Allocated were a battalion each from the rifle troops, artillery from the 11th and 98th rifle divisions, detached groups of the 71st Detached Motorized Rifle Brigade, and tanks from the 192d Rifle Brigade and 204th Tank Regiment.

Because of the camouflage, our command succeeded in disorienting the enemy and concealing the axes of the main attack. The enemy pulled up and placed two divisions in a defense against the army's right flank, where the axis of the main attack had been simulated.

Camouflage was also strictly observed during preparation of the entire operation of the Leningrad Front (commander, General L. A. Govorov; chief of staff, General D. N. Gusev). The transfer of the 2d Assault Army from near Leningrad to the Oranienbaum beachhead was carried out along the Gulf of Finland by ships of the Red Banner Baltic Fleet under exceptionally complex conditions. The proximity of the main channel to the enemy positions, the constant artillery fire on the channel and on the loading and unloading points, and the frequent storms complicated the transport runs, which were conducted only at night. In addition, there was no special transport equipment to deliver heavy cargo. The staffs of the fleet, of the Leningrad Naval Base, and of the Kronstadt Naval Defensive Region precisely planned the transport runs, the careful camouflage of the loading and unloading operations, and the reliable artillery and air support during concentrated opposition by enemy forces.

By 20 November the missions assigned by the front command to transport troops and equipment had been executed: more than 30,000 men, dozens of tanks, hundreds of vehicles and guns, and thousands of tons of cargo were delivered by the sailors to the Oranienbaum beachhead.

In connection with a new order by the commander of the Leningrad Front, on 22 December operational transport of the troops was renewed. Great numbers of men and large quantities of weapons and equipment had to be transported in a short time. This was not easy in winter: ice 10 to 15 centimeters thick had appeared. Gale winds caused the ice floes to shift and contract. In winter each transport run took much more time than in November. Often, the ships were not able to complete the trip in the dark and, icebound, were fired on by the enemy during the day. Additional measures were required: smoke generation equipment was installed along the coast of the inlet around the mouth of the Neva River to cover the ships with smoke, and smokelaying cutters were in direct escort of the convoys; all vessels taking part in the transport runs had camouflage paint; artillery and aviation were in constant combat readiness. More than once during the transport runs, our artillerymen and pilots engaged in combat with enemy batteries trying to prevent the execution of the fleet's assigned missions.⁵

Despite the extraordinarily difficult winter navigation in ice, and the impracticability of the transport equipment for delivery of heavy equipment, by 22 January the fleet had successfully completed the transport. In all, 53,797 men, about 2,300 vehicles and tractors, 211 tanks, 677 guns, and about 30,000 tons of cargo were delivered to Oranienbaum.⁶

A powerful grouping of our troops was created at the Oranienbaum beachhead, considerably exceeding the enemy in forces and equipment. In his memoirs Marshal of the Soviet Union K. A. Meretskov wrote: "The 2d Assault Army, under the command of General I. I. Fedyuninskiy, awaited the signal on the Oranienbaum beachhead. The army had been brought there by the sailors of the Baltic Fleet. Under the very nose of the enemy, the sailors conveyed tens of thousands of soldiers, hundreds of tanks and guns, and thousands of tons of ammunition over the frozen bay during the winter nights. And all of this was kept secret from the enemy."⁷ Because of the camouflage conducted, the enemy not only did not discover the concentration of our troops at the beachhead, but, just the opposite, assumed that the front command was transferring the troops to Leningrad. For 2 months, only in fog and at night, the movement of the ships and troops continued.

The successful troop regrouping, with the observance of full operational camouflage, made it possible to concentrate the troops and make a surprise attack from the Oranienbaum beachhead. This determined the success of the 2d Assault Army's offensive and later made it possible, together with troops from other armies of the Leningrad Front, to rapidly achieve the defeat of the enemy's Peterhof-Strelna force.

* * *

The Korsun-Shevchenko operation was conducted in January-February 1944. The intention was to surround and destroy the opposing enemy force with simultaneous encounter attacks by the troops of the 1st and 2d Ukrainian fronts.

During preparation for this operation a large-scale troop regrouping was conducted on the 2d Ukrainian Front near Kamenka, Verbovka, and Tomashevka, from where the main attack was to be made, and artillery and the 5th Guards Tank Army, positioned near Gruzskoye (west of Kirovograd), were transferred.

To keep preparation of the operation secret and to deceive the enemy, the decision was made to carry out a series of operational camouflage measures. Regrouping of tanks and artillery would be carried out at night and in poor visibility, and troops and equipment would be carefully sheltered and camouflaged in the new area. At the same time, a concentration of tank units and artillery in the 5th Guards Army's coming zone of operations would be feigned.

By order of the front's commander, Marshal of the Soviet Union I. S. Konev, the staff of the 5th Guards Tank Army fixed false concentration

areas and charged the staff of the army's engineer troops with deciding how to lay them out and make them appear real.

Five areas for the false concentration of tanks and 12 for artillery were determined by reconnaissance. The false areas were selected in places where troops had been recently located. Mock-ups of tanks and guns were installed, and false fuel and ammunition depots were set up at the same time. Captured diesel oil, rags, and straw were used to simulate fires.⁸

Specially allocated army radios operated in the false concentration areas to simulate tank army, corps, brigade, and battalion radio communications.

General A. D. Tsirlin, former chief of engineer troops of the 2d Ukrainian Front, recalled that a front camouflage company and two engineer battalions of the 14th Assault Combat Engineer Brigade (seven companies in all) were used to conduct engineer work to provide operational camouflage.

From 18 through 22 January, 126 tank mock-ups, 30 gun mock-ups, and 200 soldier dummies were made and installed in the simulation areas. At the same time, false artillery positions, fuel and ammunition depots, dugouts, and slit trenches were equipped. In all, 17 false fuel depots and 17 dugouts were created, and 15 slit trenches were dug in the simulation areas for the disposition of tank formations.

To make the simulation areas appear real, tracks from the movement of tracked and wheeled vehicles were made, mock-ups were moved from one place to another, camouflage was renewed, and hearths were maintained to simulate fires after enemy air raids and artillery shellings. Specially allocated roving guns simulated troop concentration areas and showed artillery operations beyond the main artillery positions.

The feints conducted to simulate the axis of the main attack in the zone of the 5th Guards Army, which operated on a secondary axis, were justified. The enemy was somewhat contained on this axis.⁹

On the whole, operational camouflage did not provide the desired results. During its use, not all of the false areas were occupied by troops, many areas were not supplied with tanks to simulate motor noises and vehicle tracks on the ground, and the detached combat engineer subunits were weak in preparing mock-ups, building false field installations, and camouflaging artillery positions and the combat equipment of tank units.¹⁰ Radio discipline was violated, and so fascist German signals intelligence determined the movement of the staff of the 5th Guards Tank

Army from near Kirovograd to the north on 21 January 1944.

* * *

In summer 1944, troops of the 1st Baltic and 1st, 2d, and 3d Belorussian fronts, conducting the Belorussian operation, made a powerful attack against the fascist German Army Group Center.

The intention of Supreme High Command General Headquarters was to break through the enemy's defense, surround and destroy its large flank forces near Vitebsk and Bobruysk, and then defeat the main forces of the German 4th Army, surrounding it near Minsk before advancing to our western borders. All of this was to be done simultaneously by the forces of four fronts operating on several axes.

The Belorussian SSR, a large part of the Lithuanian SSR, and the eastern part of Poland were completely liberated during the operation. Our troops reached the borders of East Prussia, crossed the Narev and Vistula rivers, and seized bridgeheads near Serotsk, Rozhany, Magnushev, and Pulawy. Of the 97 enemy divisions and 13 brigades that took part in the battles at different times, 17 divisions and 3 brigades were totally destroyed and 50 divisions suffered losses of 60 to 70 percent of their personnel.

The success of the Belorussian operation was furthered by operational camouflage of the troops.

About 400,000 tons of ammunition, 300,000 tons of fuel and lubricants, and about 500,000 tons of rations and forage had to be sent to the fronts. Five combined arms armies, 2 tank armies, 1 air army, and the 1st Polish Army had to be concentrated in the given areas. In addition, General Headquarters transferred to the fronts, from its reserve, 5 detached tank corps, 2 mechanized corps, 4 cavalry corps, and dozens of detached regiments and brigades of all branches of troops. It also rebased 11 air corps.¹¹

As a result, by the start of the operation, the 4 fronts numbered 1,430,000 men, more than 31,000 guns and mortars, 5,200 tanks and self-propelled artillery pieces, and about 5,000 combat aircraft.

To create such a large force and conceal it from the enemy in the central sector of the Soviet-German Front was a complex affair requiring great effort by the Communist Party, General Headquarters, and the General Staff.

"The coming troop regrouping and the transfer of everything needed for the Belorussian operation from the interior of the country," wrote

Marshal of the Soviet Union A. M. Vasilevskiy in his memoirs, "demanded the great effort and attention of the party's Central Committee, the General Staff, and the central directorates of the People's Commissariats of Defense and Communications. All of this colossal work had to be conducted in strict secrecy to conceal from the enemy the tremendous amount of preparatory work for the coming summer operation."¹²

The belligerents' correlation of men and equipment favored the Soviet troops. However, taking into account the Hitlerites' huge force, their strong, deeply echeloned defense, and the wooded, marshy terrain, our fronts had to prepare carefully for the offensive, secretly concentrate the troops, and make powerful surprise attacks.

The successful conduct of the Belorussian operation depended greatly on operational camouflage of the troops. Supreme High Command General Headquarters and the General Staff paid extremely serious attention to this. Thus, a General Headquarters directive of 29 May 1944 required front commanders to conduct all movements of troops and equipment only at night while strictly observing march discipline. Movement by day was permitted by separate groups during absolute non-flying weather and beyond enemy ground observation. During rests and in new areas, the troops were to be dispersed and carefully camouflaged, contact was not to be allowed between personnel and the local population, and movement of groups and subunits along open roads and sectors of an area was to be restricted as much as possible. Special attention was to be given to concealing the relief of front-line troops.

The existing firing schedule was to be maintained throughout the regrouping and preparation for active operations. A sequence of artillery and mortar ranging fire was to be established to conceal the artillery force on the main axis.

Newly arrived formations were forbidden to conduct ground reconnaissance, and the conduct of commander's reconnaissance by large groups was also forbidden. To conceal the real sector of active operations, the activity of reconnaissance groups was to be planned on a wide front.

The construction of defensive works was to be conducted in the zone designated for active operations, and attention was to be paid to the realistic appearance of the false minefields that were created. During disposition of the troops at rest stops or during their withdrawal to concentration areas, the conduct of concentrated antiaircraft artillery fire on single enemy reconnaissance aircraft was prohibited. All antiaircraft weapons were to be ready to repulse raids only by large groups of enemy aircraft.

Following the orders given earlier, radio silence was to be strictly observed.

Familiarization flights over enemy territory by the flying personnel of new units in the air armies were forbidden. Only leaders were permitted to make flights a day or two before the start of active operations, after establishing the flight zone to a depth that guaranteed that an aircraft would land on our territory if damaged by enemy fire.

There was to be no correspondence about the measures conducted. The content of documents prepared because of extreme need was to be divulged only to a strictly defined group of persons who would sign for the material. Direct presentation of requisitions from the directorates of the chiefs of the branches of troops to the central directorates of the People's Commissariat of Defense was forbidden; requisitions were to be sent only by the front staff. Calls, especially open ones, about the measures conducted were forbidden by wire communications, and strict control was established over communications centers.

The theme of defense was to be allotted a major place in the army press; inserting articles and notes that in any way explained preparation for the coming operation was categorically forbidden.

Careful daily control was to be organized over the execution of all orders on camouflage. Daily air inspections were to be conducted of camouflage of the staff and troop dispositions; special front and army staff officers were to be designated for this. Troop regrouping was to be put under special observation: officers of operational departments were to be detailed, and they were charged with collecting information and reporting on the verification of the troops' camouflage. The camouflage inspections were to be reported daily at 2200 to the General Staff.¹³

The General Staff tried to disorient the fascist German command by organizing Soviet troop offensives in other sectors of the front, specifically, in the Baltic and in the Ukraine.

"In preparing the Belorussian operation," wrote General S. M. Shtemenko, "the General Staff wanted to somehow convince the Hitlerite command that the main Red Army attacks in the summer of 1944 would come in the south and in the Baltic. On 3 May the commander of the 3d Ukrainian Front was given the following order: 'You are charged with conducting operational camouflage to deceive the enemy. A concentration of eight to nine rifle divisions, reinforced with tanks and artillery, must be shown beyond the right flank of the front. . . . Activity must be demonstrated in the false concentration area by moving and positioning separate groups of personnel, vehicles, tanks, and guns, and by conducting

engineer preparation of the area; antiaircraft guns must be placed near tank and artillery mock-ups; air defense of the entire area must be shown simultaneously by installing antiaircraft guns and patrolling with fighters.

'The visibility and realistic appearance of the false objectives will be verified by air observation and photography. . . . Operational camouflage will be conducted from 5 through 15 June of this year.' ¹⁴

A similar directive was sent to the commander of the 3d Baltic Front. This front carried out camouflage east of the Cherekha River.

Operational camouflage was conducted successfully on both fronts.

A small group of people was enlisted to work out the plan for the Belorussian operation. Only the deputy of the Supreme High Command and the chief of the General Staff and his deputy knew about the plan in full. The operational considerations of the fronts were worked out by two or three responsible staff workers. These documents were not reprinted, but were reported, as a rule, to the commanders personally.

General Headquarters and General Staff measures to increase the camouflage of the troops made it possible, without the enemy's knowledge, to regroup and concentrate a large number of troops and large quantity of combat equipment in the area of the coming operation.

On 16 June General Headquarters ordered the commanders of the 2d and 3d Baltic and 1st Ukrainian fronts to "organize and conduct reconnaissance in force from 20 through 23 June 1944 in a series of sectors on the front with detachments ranging in strength from a reinforced company up to a reinforced battalion."¹⁵ Planned at this same time was reconnaissance in force in the zone of the 1st Baltic and 1st, 2d, and 3d Belorussian fronts. The General Headquarters order was executed successfully. Over 60 forward detachments operated at once in a sector of over 1,000 kilometers. This was the first time in the Great Patriotic War that reconnaissance in force was conducted on such a wide scale. As a result, the enemy was disoriented about the axis of the main attack of the Soviet troops.

The fronts also executed other assigned missions successfully. They conducted numerous measures to keep secret the preparation of operations and to disorient the enemy. The directives and plans for operational camouflage carefully worked out in the front staffs contributed to this. Thus, for example, the following was said in the directive of the military council of the 1st Baltic Front on 30 May 1944.

"For operational camouflage and the achievement of surprise during conduct of an operation, the troops must be concealed from enemy air

observation and reconnaissance on marches and in dispositions areas. For this, the following is necessary:

"Commanders at all levels are required to carefully camouflage the troops from enemy air and ground observation and to keep the goals and missions assigned to the troops in strictest secrecy.

"Strict military discipline must be achieved by the troops on marches and in dispositions.

"Wire communications and mobile communications are to be set up on marches. Radio communications are categorically forbidden.

"Troops and equipment are to be dispersed and carefully camouflaged during long halts. Assemblies, movement, and fires are categorically forbidden, and the most careful camouflage of troops, unit trains, vehicles, and combat equipment is unswervingly required. Contact between personnel and the local populace is not to be allowed.

"All reconnaissance is to be conducted with small groups on a wide front, including passive sectors, under the guise of inspecting the defense, without disturbing the routine established for the troops in their defensive zone. Participants in reconnaissance groups are to be dressed primarily in Red Army and partly in field officer uniforms of lieutenants, captains, and majors, and are to be given instructions and certificates giving them the right to inspect the condition of the defense and the course of defensive construction. Tank crews are categorically forbidden to appear in reconnaissance on the forward edge of the defense; the carrying of automatic weapons is mandatory.

"Special attention is to be given to camouflaging observation posts and artillery and mortar fire positions.

"Camouflage work is to be conducted only at night.

"The entire territory is to be divided into the following zones to more efficiently organize the control service: the front territory from the line of the front bases (the town of Nevel) to the line of the army bases (Zheleznitsa-Bychikha); the army territory from the line of the army bases (Zheleznitsa-Bychikha) to the line of the division supply points; the troop territory from the line of the division supply points to the forward edge of the defense.

"The chief of staff of a front is to be charged with organizing the control service in the front zone; in army and troop zones, corps commanders and army military councils are to be charged with this.

"The control service is to be organized as follows: throughout the troop zone to a depth of 10 to 12 kilometers from the forward edge of the defense and in areas under engineer work in preparation for a bridgehead for an offensive; on all roads used for troop movement, transport, and evacuation; in troop dispositions for the entire period of disposition; at front and army bases and division supply points.

"A control office is to be established on each road and in each future troop disposition. Such offices are to be headed by control chiefs who are officers from the operational departments and from sections of the front, army, corps, and division staffs. The control chief is to be charged with the responsibility for strict order and camouflage of the troops. He is to be given a group of officers from the army and front reserves and entire rifle subunits and units to perform control service on the roads and in troop dispositions.

"All officers of the control service are to be provided with automatic weapons, sleeve insignia, and certificates signed by the chiefs of staff of the front and of the army military councils.

"The demands of control posts on the roads and in troop dispositions are to be obligatory for all and subject to immediate execution.

"Front and army communications chiefs are to provide permanent wire communications on all march routes and telephones at each officer's control post and at each control office. For this purpose, the necessary communications equipment is to be allocated to the road and area control chiefs.

"The chief of staff of a front is to organize air and ground control over troop movements on roads, over their camouflage on marches and in dispositions, and also over the camouflage of staffs. Several permanent U-2 crews are to be prepared for this, and a regular flyover established day and night.

"The chief of a front's rear services is to procure and provide armies and front units special passes for daily movement of motor transport within a prescribed limit."¹⁶

The directive of the military council of the 1st Baltic Front was executed in full, and this was of great importance in successfully conducting the operation.

During preparation of the Belorussian operation, there were large-scale troop regroupings, and the maneuver of the 6th Guards Army from the right wing of the front, where it occupied the defense, to the center, in

the direction of the front's main attack, was successfully carried out in secret from the enemy. In the center, the army was put into the first echelon between the 4th Assault Army and the 43d Army. Judging from information from the staff of the German 9th Army Corps for 18 to 20 June 1944, the 6th Guards Army did not enter the enemy reconnaissance's field of vision at all. Only on 22 June, the day before the start of the offensive, did the enemy determine that one of this army's divisions was operating northwest of Vitebsk. "The offensive northwest of Vitebsk was especially unpleasant," wrote K. Tippelskirch, "since it, unlike the attacks on the rest of the front, was totally unexpected, striking an especially weakly defended sector of the front on an axis that was operationally decisive."¹⁷

The following contributed to concealing the regrouping of the 6th Guards Army: a detailed regrouping plan and precisely determined march route, time, and order of movement for each formation; timely reconnaissance and preparation of the march routes, along which the movement of troops, motor transport, and rear services was conducted only at night under blackout; careful camouflage of supply transport and of all other operations to prepare for the offensive; precise organization of the control service and maintenance of troop discipline on the march and in dispositions; systematic air and ground control over troop movement and disposition; immediate action against camouflage violations.¹⁸

During preparation to conduct the Belorussian operation, work was carried out on all fronts to improve the defense. Front, army, and division newspapers published material only on defense subjects. In discussions, agitators and propagandists directed personnel to firmly hold occupied positions.

The time of our troops' going over to the offensive was kept in deep secrecy. Not until several hours before the start of the operation did the military councils of the fronts turn to the troops with the call to deliver a crushing blow on the enemy and free the Belorussian Soviet Republic.

Periodic control and inspection of the work of the front staffs by representatives of General Headquarters and of the General Staff played a large role in the successful conduct of operational camouflage.

"It was established through inspection," recalled Marshal of the Soviet Union A. M. Vasilevskiy, who coordinated, as a representative of General Headquarters, the operations of the 3d Belorussian Front, "that the command, staff, and political directorate of the front were giving serious attention to the camouflage of the combined arms, tank, and artillery formations and other special troop units and all sorts of military cargos that were arriving at the front. The officers of the front staff met the troops at the unloading stations and escorted them to their prescribed concentra-

tion areas; the officers demanded the strictest camouflage. . . . The troops' combat training was also seriously organized on well-equipped ranges and training fields in the rear, where divisions and special units, intended for the breakthrough, were sequentially and secretly withdrawn into the second echelons."¹⁹

Also contributing to the secret preparation of the Belorussian operation were the offensive of the Leningrad Front on a secondary (the Vyborg) axis, begun on 10 July 1944; the false transport of cargos to the fronts operating on southern and southwestern axes; strict communications security; and maximum reduction of correspondence between the General Staff and the front staffs, and of the latter with the army staffs.*

Operational camouflage was conducted successfully on all fronts. Its organization on the 1st Belorussian Front (commander, General K. K. Rokossovskiy; military council member, General N. A. Bulganin; chief of staff, General M. S. Malinin) was of special interest.

As early as May 1944 General Headquarters had ordered the commander of the 1st Belorussian Front to prepare and conduct an operation to defeat the enemy's Bobruysk force and then reach Osipovich, Pukhovichi, and Slutsk with the main forces. To break through the enemy defense two attacks had to be made: one, with the forces of the 3d and 48th armies, from near Rogachev in the general direction of Bobruysk and Osipovich; and the other, with the forces of the 65th and 28th armies, downstream on the Berezina and near Ozarichi in the general direction of Slutsk.

The most pressing task was the destruction of the enemy's Bobruysk force and the seizure of the Bobruysk, Glusha, and Glusk area. In addition, some of the forces on the right flank were to assist the troops of the 2d Belorussian Front in defeating the enemy's Mogilev force. Then, developing the offensive, our forces would reach Pukhovichi, Slutsk, and Osipovich.²⁰

General Headquarters demanded, noted Marshal of the Soviet Union G. K. Zhukov at one of the meetings of the command staff, that, on the one hand, the main attacks from near Bobruysk, northwest and southeast of Vitebsk, be concealed by all means, and, on the other hand, that the impression be created of preparation for an attack from the Orsha-Rogachev Front to distract German attention to this sector and hold enemy forces on this axis so that they could not take part in repelling the main attacks of our troops from the south and north.²¹

* The Soviet command prohibited operation of radios on transmit in all front and army nets, except for those for the air force, air defense, reconnaissance battalions, and artillery fire control.

The decision was made to prepare the front's attack with large forces in a wooded area to achieve total surprise. The troops were to advance through a marshy area to envelop Bobruysk from the south and southwest.

Because the terrain was not easily passable, the enemy did not assume that the Soviet Supreme High Command would risk conducting a powerful attack through a wooded, marshy area and so was not seriously concerned with the defense of this axis; even enemy reconnaissance was insufficient. The enemy conducted, in essence, a pocket defense here.

The large forests made it easier for the 1st Belorussian Front to secretly create a powerful grouping and also to conduct troop movements and necessary regroupings, to concentrate the troops in their attack positions, and to carry out engineer preparation of these areas.²²

The front staff carefully worked out a plan for concentrating the troops and conducting operational camouflage. This plan was approved by the military council on 30 May 1944.²³ "We required that staffs at all levels maintain constant control from the ground and the air," recalled Marshal of the Soviet Union K. K. Rokossovskiy, "over careful camouflage of everything that went on at the front. The Germans could see only what we wanted to show them. Units were concentrated and regrouped at night, and railroad echelons ran from the front to the rear by day with mock-ups of tanks and guns. In many locations, false crossings were made and false roads were laid out. Many guns were concentrated on secondary lines, a number of artillery strikes were conducted, then the guns were taken to the rear, and mock-ups were left in the false fire positions. The chief of staff of the front, General Malinin, was inexhaustible in this regard."²⁴

The troops on the left wing of the 3d Belorussian Front on the Orsha axis and the troops of the 2d Belorussian Front on the Mogilev axis disoriented the fascist-German command and diverted considerable forces through false troop movements and regroupings, frequent reconnaissance of the enemy, and active air operations, as had been proposed by General Headquarters.

Much attention was also given to tactical camouflage on the 1st Belorussian Front. This is indicated, for example, by the directive of 23 May 1944 from General A. I. Proshlyakov, the chief of engineer troops of the front, which required that strict camouflage discipline be established in the troops' combat formations and in all of their combat. The goal was to:

—assist the troops with men and equipment (allocation of instructors, combat engineer teams, materials) to carefully camouflage the entire system of defensive zones and separate fortifications and obstacles; give

special attention to camouflaging defensive installations during engineer work;

—instruct infantry officers in battalions and companies to skillfully and intelligently use camouflage resources and to popularize camouflage methods among the rank and file by showing examples of their successful employment in combat by different units and formations;

—provide the leadership the following basic instructions on the camouflage: cover visible sections of trenches and lines of communication with vertical screens, which are installed at the start of engineer work; make forward breastworks and rear slopes of breastworks blend in with the terrain (smooth or hilly plowed land, meadow, brush); set up concealed approaches to command and observation posts without fail; carefully camouflage blockhouses and earth and timber emplacements by situating them well and matching them to the terrain (other methods are not effective); and cover muzzle flashes with natural or artificial vertical screens during artillery and mortar firings;

—more carefully camouflage the system of defense from air observation, especially trenches and lines of communication, covering their important sections with overhead screens;

—begin the construction of false zones—setting up mock-ups of combat equipment in them—to disorient the enemy about the depth and type of the defense and about the fire system;

—take an active part in the work to photograph from the air separate sectors of the defense from 21 through 26 June to reveal violations of camouflage in the system of defense.²⁵

The engineer directorate of the front issued a special booklet on camouflage to noncommissioned officers and enlisted men.

“In modern warfare,” the booklet stated, “it is impossible to trust everything that you see before you. Machine guns can appear unexpectedly in a deserted field, seemingly springing out of the earth, and open fire. A small hill or a stump can shelter a camouflaged sniper or observer. On the other hand, structures that look threatening, from which it seems withering fire is about to begin, often prove false, built so that the deceived enemy will concentrate its attention on them and waste ammunition on their destruction.

“Deception of the enemy is the main goal of camouflage. To conceal everything from the enemy is impossible; the enemy must be deceived, forced to think that there are many troops where there are really few, and

that there are few where the main forces are. But deception succeeds only when all of the soldiers are skillfully camouflaged.

"Comrade, master the methods of camouflage, demonstrate your cleverness and resourcefulness in this matter!

"If the area of engineer work is visible to the enemy, then, before the start of such work, install vertical screens 30 to 50 meters in front of the trenches. Try to make these screens barely visible to the enemy, and make them blend with the color of the terrain. Remember that screens must not hinder observation and disturb the conduct of fire.

"Camouflage breastworks and trenches in the following manner: on hilly, uneven terrain, do not level the breastworks carefully; on plowed land, level the breastworks well and make furrows along them to simulate plowed land. The color of the breastworks must always be the same as that of the surrounding terrain.

"To help in camouflaging trenches, remove sod, tall weeds, or brush, along with all roots and a layer of soil 10 to 12 centimeters thick, in the area where you plan to dig the trenches and pile all of this to the side. If you are digging a trench in ground not covered with vegetation, then remove the top layer of soil and pile it to the side all the same. After digging the trench, the sod or upper layer of soil will be needed to camouflage the breastworks. If there is not enough sod, then get more of it from off to the side. . . .

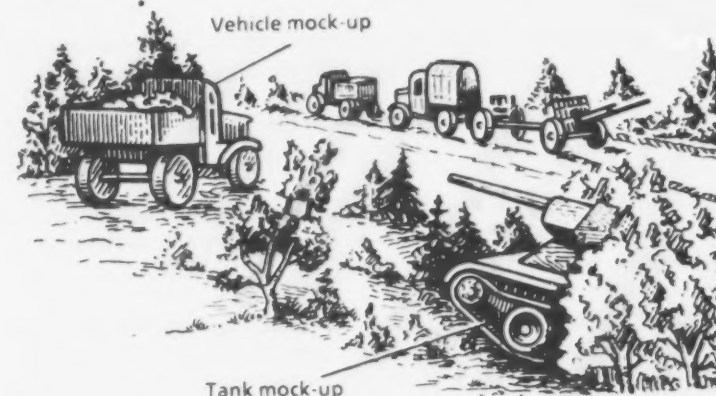
"To sod installations or breastworks on high ground, it is necessary to take sod from off to the side on the same high ground; to sod a depression, sod must be taken from the depression. Get sod 10 to 12 centimeters thick in separate pieces 20×40 centimeters in size or in rolls 120 centimeters long. Before laying out the sod, loosen the top layer of soil and, if needed, sprinkle it with a 1 to 2 centimeter layer of moist soil so that the sod will take root rapidly. Lay the sod out as tightly as possible and fill any cracks with earth so that the moisture does not evaporate.

"Because an entire network of trenches is difficult to conceal from air observation, the most important sections of the trenches (points of intersection with supplementary trenches, lines of communication, locations of observation posts, shelters, antitank ditches, heavy machine guns, and mortars) must be covered, leaving only windows for illumination. Overhead trench covers must be made flush with the breastworks.

"Blockhouses and earth and timber emplacements are detected because the enemy sees their embrasures and their regularly shaped mounds of earth. Therefore, build blockhouses or earth and timber emplacements

only where they can be fit into the terrain well so that they do not rise above it; they are best located on a reverse slope for the conduct of flanking fire. Embrasures, before they are fired from, must be covered with folding shields camouflaged to match to color of the installation and the terrain. Make a slot in the shield for observation. . . .

"Artillery positions betray themselves by the characteristic shape of gun shields, the shine of metal parts, the movement of crews, the sound and flash of shots, the dust raised during firing, and the paths worn up to the fire positions. . . .



Drawing 8. False troop concentration.

"Here are the basic rules for camouflaging guns: select a fire position so that the terrain makes camouflage easier; do not chop down extra trees and bushes in fire positions; repaint gun shields as often as possible to match the color of the terrain (sandy-gray spots can be made with pulverized dust; dark brown spots can be made with peat or black earth mixed with gun oil); extend paths and access roads beyond fire positions; camouflage breastworks with sod; after firing, if there is no shift of positions, camouflage blast marks with nets woven with grass, which must be changed from time to time; to conceal an artillery position from air observation, do not lay it out in a perfect circle; use nets to cover pits for sheltering crews and shells.

"False fire installations and equipment are used to deceive the enemy about our troop groupings and to draw enemy fire to a place where no real equipment, installations, or troops exist.

"All of the false items must be convincing to the enemy and raise no doubts. To achieve this, the following is necessary:

"Select positions that would be suitable for real equipment and installations; conceal false objectives carefully from enemy observation, or the deception will be spotted at once; false objectives must be made to appear real to the enemy. For example, fire from roving guns should be conducted from false artillery positions. A concentration of false tanks near the forward edge should be made to sound real by the roar of motors and the clank of tracks; it is advisable to use a tractor for this. Soldiers should appear in false trenches from time to time and conduct fire.

"Use local materials—brushwood, branches, poles, straw, reeds, bast, and so forth—as much as possible to build tank and gun mock-ups.

"Mount a cannon in a false artillery emplacement, which is created by cutting sod to match the area and shape of a real emplacement.

"In this way, mock-ups can be made of any combat equipment; you only need to know the dimensions of a piece of equipment. . . .

"Wherever you are, whatever you do, always remember the need for camouflage, employ it skillfully, and execute all of the commander's instructions.

"Do not wander about needlessly near trenches and fire positions occupied by your units in the defense, and do not openly approach command or observation posts and shelters—in this way, you will conceal the defense system from the enemy (move only along trenches and lines of communication).

"At night do not light fires in a visible place and do not smoke without the commander's permission. Do not be talkative, do not converse about your unit with strangers, even with military personnel.

"If you follow all the rules of camouflage in this booklet, as well as those that your own quick-wittedness will suggest to you, then you will contribute to your unit's success in defeating the enemy."²⁶

Because of well-conceived and skillfully conducted operational and tactical camouflage, the command of the 1st Belorussian Front managed to deceive the enemy and achieve its assigned goal. This is supported by testimony from the captured General Heine, commander of the 6th Infantry Division, which occupied the defense near Rogachev. "An offensive was expected on 20-21 June. We expected especially strong attacks near Rogachev and in the sector next to the unit on our right flank. . . . It must be pointed out that the Russians prepared the offensive unskillfully: camouflage was totally absent. All transfers were conducted in daylight, so that we had the chance to count everything that

moved along the roads. Movement at night was not camouflaged either, and the impression was created that Buda-Koshelevo station would be the main Russian unloading station, from where transports and troops would be sent, for the most part, to the north.²⁷ Thus, the German general took our feint for unskillful operations.

The Soviet command managed to completely conceal the scope of the Belorussian operation being prepared.

Even several days before the start of the operation, the fascist German command thought that our troops would make the main attack on the south wing of the Soviet-German Front. The command kept 24 of the 30 tank and motorized divisions on hand at that time to the south of the Pripiet River. At a training assembly in Sonthofen on 19 June 1944, Keitel said that he did not expect a major Russian offensive in the front's central sector.

Thus, operational camouflage achieved its goal in the Belorussian operation. It determined the success of the Soviet troops' combat operations to a great extent. New aspects of its conduct included simultaneous action on several fronts, the broad scope of the camouflage, the conduct of reconnaissance in force on a wide front, strict camouflage discipline, and tighter control over the conduct of camouflage by the front and army staffs and by the staffs of the branches of troops.

The experience of conducting camouflage showed once again that, if carefully prepared and aggressively carried out, camouflage would give good results. To increase the effectiveness of operational camouflage, troops should be enlisted and the needed resources allocated to make the concentration areas of false equipment appear real.

* * *

The successful operations of the Soviet troops in Belorussia made favorable the conduct of the Lvov-Sandomierz operation, which was carried out by troops of the 1st Ukrainian Front (commander, Marshal of the Soviet Union I. S. Konev; military council member, General K. V. Kravnyukov; chief of staff, General V. D. Sokolovskiy). The goal of the operation was to destroy the enemy's Northern Ukraine army group and liberate the western Ukraine. The intention of General Headquarters was to make two attacks, on the Rava-Russkaya and Lvov axes. The operation began on 13 July and lasted until 31 August 1944. After breaking through the enemy defense, Soviet troops surrounded and destroyed a 50,000-man enemy force near Brody. Then, in the first days of August, they rushed across the Vistula and seized a large bridgehead near Sandomierz. The

western Ukraine was liberated, 32 enemy divisions were defeated, and 8 divisions were annihilated.

Operational camouflage was important for the successful completion of the missions assigned to the front. The fascist German command, wrote Marshal of the Soviet Union A. A. Grechko, correctly surmised "that in the coming . . . offensive, the main efforts of our troops would be transferred from the Stanislav axis, which was disadvantageous because of the terrain, to the Lvov and Rava-Russkaya axis, that is, precisely to those axes intended by General Headquarters for operations by the assault groupings of the 1st Ukrainian Front."²⁸

In the situation at hand, the front command thought it necessary to upset the enemy's notions about the probable axes of our attacks and to conceal the time of the offensive and the forces of our assault groups.

The main attention was focused on strict observation of radio silence during troop regroupings, on scheduled use of other means of communications, and on conduct of operational camouflage on the left wing of the front. The essence of the camouflage was the simulation, in the zone of operations of the 1st Guards Army (commander, General A. A. Grechko; chief of staff, General A. G. Batyunya), of the concentration of a tank army and a tank corps, and, in the zone of operations of the 18th Army (commander, General Ye. P. Zhuravlev; chief of staff, General F. P. Ozerov), of a single tank army. This simulation was achieved by conducting false transports of tanks by railroad; by simulating unloading areas for tank formations and movement of the formations from these areas to concentration areas; by simulating concentration areas and the massing of forces in the attack position for an offensive; and by deceiving the enemy through the local populace.²⁹

These measures were conducted to create in the enemy the impression of the lengthy deployment of the 1st Guards and 4th tank armies on the Stanislav axis, while actually these armies were regrouping on the Lvov and Rava-Russkaya axes.

Operational groups made up of representatives from the branches of troops and from political departments were created in the armies to organize and control the operations of all the allocated resources. Overall control was carried out by the commanders and chiefs of army staffs, who demonstrated great skill in conducting this important aspect of operational support of the troops.

In the 1st Guards Army, camouflage was carried out in the following manner (appendix 5).

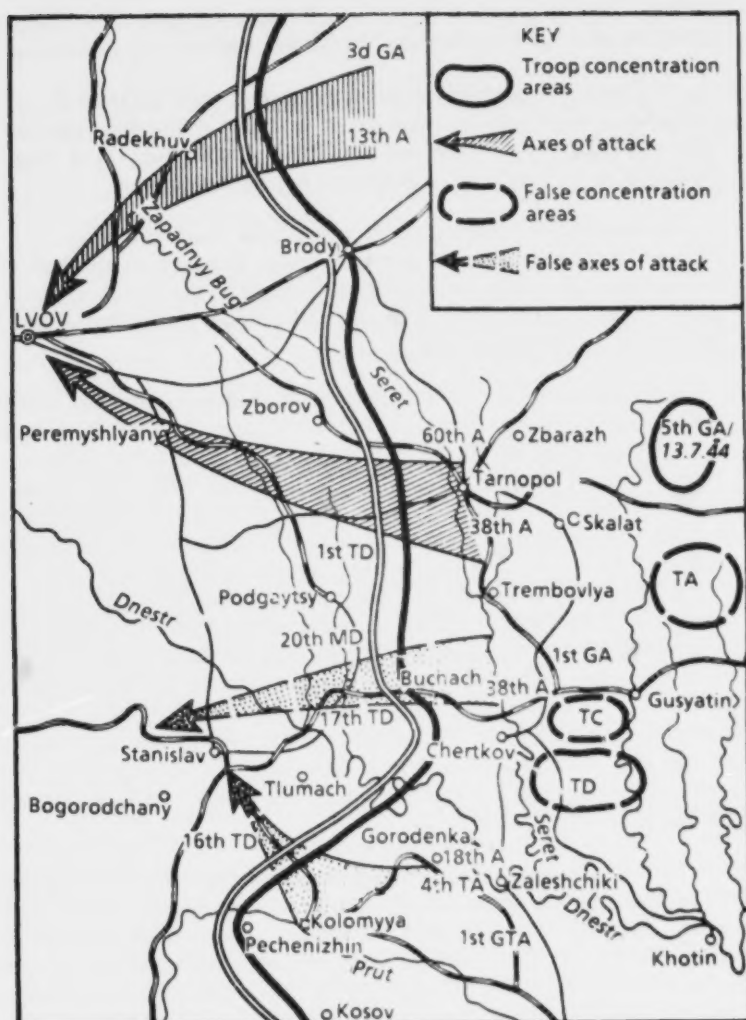


Figure 7. Plan for operational camouflage of the troops on the 1st Ukrainian Front (2-20 July 1944).

The army commander decided to organize and conduct a false concentration of a tank army near Chertkov, Bazar, and Tluszcz, and of a tank corps near Kopachynitse, Korniyuv, and Tyszowce. This decision was developed in detail and was reflected in the plan put together under the front staff's instructions. It consisted of the following:

1. Create a false unloading area for a tank army near the Gadyinkovtse

station. Conduct simulation from 3 through 10 July 1944. The real unloading area for the army was Vorvulintsy station.

2. Create the appearance of movement of tank columns from the unloading area to concentration areas; assemble false tank corps in the following areas: the forest east of Byaly Potok; the forest east of Yagelnitsa; the Chagor, Mikhache, and Repushintsy forests.

3. Simulate the moving up of troops into attack positions from 17 through 20 July: for the tank army, Slobudka Dzhurynska and Polovtse; for the tank corps, Voronov Gavrilak. Prepare a false attack of the tank army toward Buchach from Slobudka Dzhurynska and Polovtse, and of the tank corps toward Klumach.

Allocated from the 1st Guards Army to conduct camouflage were the 114th Combat Engineer Battalion of the 6th Combat Engineer Brigade, the 583d Detached Combat Engineer Battalion of the 280th Rifle Division, the 558th Detached Combat Engineer Battalion of the 309th Rifle Division, the 197th Detached Combat Engineer Battalion of the 151st Rifle Division, the 325th Rifle Regiment of the 129th Rifle Division, the 957th Rifle Regiment of the 309th Rifle Division, a training battalion of the 113th Army Reserve Rifle Regiment, a battalion of junior lieutenant cadets, 2 battalions of the 840th Artillery Regiment of the 280th Rifle Division, a detached antiaircraft machine gun company of the 309th Rifle Division, 2 chemical protection companies, 6 T-34 tanks from the 1st Tank Regiment, 36 vehicles from the 522d Motor Battalion, and 2 tractors from the Chelyabinsk Tractor Plant. In addition, the front staff allocated 2 platoons of the 22d Detached Camouflage Company, 150 disassembled T-34 mock-ups, 2 powerful loudspeaker units, 3 RB radios, and 8 vehicles from the 7th Motor Company.³⁰

The allocated men and equipment were used under the following plan: the combat engineer battalions set up false installations; the rifle subunits carried out auxiliary work (guarding simulation areas and making them appear real); the artillery subunits made the false positions appear real; the tanks and tractors made tracks in the areas where mock-ups were installed and simulated engine noise near the enemy's forward edge (the tanks sometimes fired on the enemy). The concentration and unloading areas were covered by antiaircraft weapons.

During unloading, radios operated at Gadyukovtse and Vorvulintsy stations; on 8 July, they were moved to the concentration areas. Operations were conducted under a special program devised by the front communications directorate.

The personnel of the camouflage platoons were used as instructors for work with the collapsible tank mock-ups; they also accompanied the

echelons with the mock-ups. Teams of camouflage specialists were dressed as tank crews.

To control the operations of all the allocated men and equipment, the army commander ordered the creation of an operational group composed of representatives of the branches of troops and headed by Colonel Markelov. Major Slobodyanik, from the front staff, served as advisor on the conduct of the operation.

In each simulation area an officer was designated who was responsible for conducting measures at the given objective. The operational group coordinated operations outside the simulation areas and organized cooperation between various branches of troops. Communications were maintained only through messengers and communications officers.

By 16 July, when the concentration of the false equipment was finished, 154 collapsible tanks had been made, 299 tanks and 568 guns had been built from local materials, 68 vehicles and 30 field kitchens had been assembled, and 6 fuel bases had been laid out.³¹

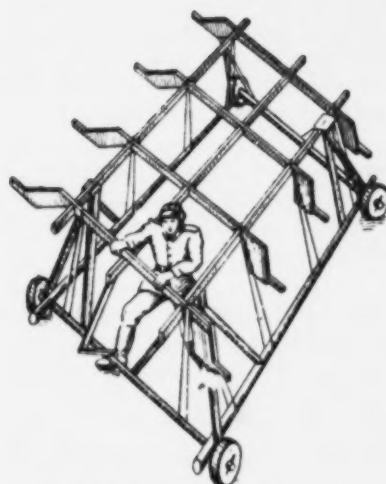
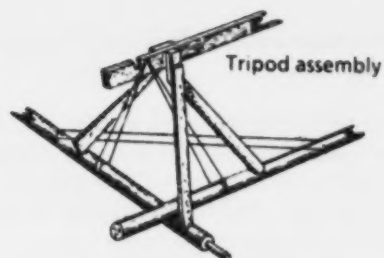
The installation areas for mock-ups were guarded by rifle subunits. From 17 to 19 July, at night, the disassembled tank and gun mock-ups were transferred from the concentration areas to the attack positions, where they were installed with regard to the specific tactical features of the terrain and in full conformity with the disposition of tanks under combat conditions. By 20 July, 145 tank and 179 gun mock-ups had been installed in the attack positions.

Railroad echelons arriving with the mock-ups at their designated stations were put on sidings or taken to sections of new track far from the stations. The unloading areas were carefully guarded. An echelon was unloaded in 1.5 hours, and the unloading was accompanied by noise from tractors or powerful loudspeakers. When enemy aircraft appeared, an area was covered with smoke by chemical protection companies. Simultaneously, the approach of infantry and motorized infantry vehicle columns to the concentration areas was simulated. At night, vehicles were moved with headlights flashing; during the day, they were moved with crowns of trees fastened to their sides to stir up more dust.

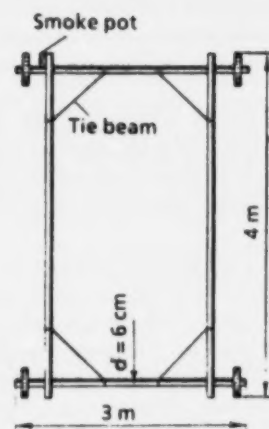
The subunits carried out a march toward the forward edge by day; at night they returned to their starting points over field roads. The march routes were equipped with markers and signs showing the location of "units." Tanks were delayed in populated areas as if for inspection. Tanks lagging behind were simulated by the placement of several mock-ups, assembled at night. By day, the mock-ups were given crews (camouflage specialists in tank crew uniforms) so that they would appear real.



Overall view of mock-up



Wooden frame of mock-up on movable chassis



Movable chassis made of poles on wooden rollers

Drawing 9. Collapsible mock-up of T-34 tank.

To deceive the enemy, groups of officers in tank crew uniforms, who simulated the work of billeting-party members, were systematically sent to populated areas lying in the path of the troops. Commander's reconnaissance was conducted in concentration areas and attack positions.

The reconnaissance department of the army staff planned and conducted reconnaissance in force at 13 points to reinforce the simulation of preparing to break through the enemy's defense. Combat engineers made false gaps in minefields in front of the forward edge. Repair work, enlisting the local populace, was carried out on the roads along the traffic route of the columns. From 12 July the concentration areas and defiles of the troops were covered by fighter aviation.

Because of all these measures, 68 flights of enemy reconnaissance

aircraft were recorded over the false concentration areas. The enemy repeatedly dispatched scouts to the army's zone of operations, and fired 2,900 shells at the false areas. Before 16 July, the enemy did not change the entire grouping of its forces in the zone of operations of the 1st Guards Army, although by 5 July, a considerable part of our troops had been moved laterally from the left flank to the right.

Operational camouflage was also carried out successfully in the 18th Army. From 4 through 20 July, concentration of a tank army was simulated in its zone near Ostrowiec, Zabolotov, and Gankovtsy.³² The measures conducted were led by the chief of the army staff, General F. P. Ozerov. An operational group composed of eight staff officers, headed by a deputy chief of the operational department, Colonel Soloveykin, was created to organize and control the operations. The army's political department allocated 12 officers to help this group. Engineer-Major Momotov, the staff representative of the 1st Ukrainian Front, advised on operational camouflage. Responsibility for logistic support of camouflage was charged to the commanders of the branches of troops and to the chiefs of the army services.

On 5 July the operational group went out to the staff of the simulated tank army at Soroki. The staff of the operational group quickly established wire communications with the army staff, the unloading stations, and the staff of the 9th Detached Combat Engineer Brigade. Communications with the concentration areas were carried out by motor transport.

Enlisted to execute the operations were the 132d, 133d, and 135th detached engineer battalions of the 9th Detached Combat Engineer Brigade, 2 battalions of the 145th Rifle Regiment, the 71st Detached Tank Destroyer Battalion of the 66th Guards Rifle Division, 2 batteries of the 1448th Self-Propelled Artillery Regiment of the 9th Plastun Rifle Division (10 SAU-76 self-propelled guns), an antiaircraft regiment of the 37th Antiaircraft Division, 20 vehicles from the 590th Motor Company, 2 trains and 3 tractors from the 146th Army's Cannon Brigade, a radio company, a cable company, and a mobile communications section of the 88th Detached Communications Regiment, MGU-42 and MGU-39 broadcast stations, and 2 trench outfits. In addition, the front allocated 200 men of the 23d Defensive Construction Directorate, a platoon of the 22d Camouflage Company, 2 platoons of the 30th Detached Reserve Combat Engineer Battalion, and 126 collapsible tank mock-ups.

Two railroad echelons (shuttles) were formed to simulate transport and unloading operations. The load capacity of each of the echelons (TF locomotive, 14 flatcars, and 2 covered cars) was 14 tons, which corresponded to, and was the limit for, the given type of locomotive and for the type and condition of the track (this was done for camouflage, for the

weight of the mock-ups being moved did not exceed 3 tons). The locomotive and conductor brigades of the echelons were specially selected and assigned for the entire operation.

The rail shuttle echelons operated in the sector of the Dzvinyach-Zhezhava and Gorodenka stations. Tank mock-ups were put on flatcars on a siding at the Dzvinyach-Zhezhava station. Toward the end of the day the trains left, and at night they were taken to unloading stations at Yasenuv Polny and Gorodenka. The echelons with tank mock-ups in the Dzvinyach-Zhezhava and Stefaneshi sector were moved in the evenings, when enemy reconnaissance aircraft were completing flyovers of the army's rear area supply lines.

From the start of operations, there was tighter security at the unloading stations. Slit trenches were dug for the personnel of arriving echelons. A special area for unloading tanks was built at Gorodenka station. At each station were two self-propelled guns, five vehicles, and an infantry platoon, and an MGU-42 operated at the Yasenuv Polny station. All of this was used to conduct light and sound simulation of unloading tanks. Self-propelled guns simulated tank tracks in the unloading areas and on adjacent roads. Inspection showed that the simulation corresponded completely to real unloading.

From the unloading stations, the empty cars, according to schedule, were to operate in the Stefaneshi-Zaleshiki sector during the morning flyover by enemy reconnaissance aircraft. The team simulating the transports wore tank crew uniforms. When empty cars were moving, personnel took off the uniforms and stayed in the closed cars.

From 4 through 15 July 1944, 23 echelons were received and 468 tank mock-ups unloaded at the unloading stations. Railroad documentation of the transports was recorded in the same way as for real echelons arriving from other sectors of the front, and the echelons were given numbers by the front military communications service. A heavy artillery regiment conducted redeployment during the simulation of the railroad transports, which reinforced even further the impression of a transfer of much equipment to this sector.

The routes of Gorodenka, Okno, Kamenka Velikaya, Soroki, and Pyadyki were assigned for the movement of the tank corps arriving at the concentration areas from 4 through 9 July, and those of Gorodenka, Soroki, Zagaypol, Yasenuv Polny, Balinty, and Kobylets for the tank corps arriving from 9 through 15 July.³³

Reconnaissance of these march routes was conducted by a specially allocated group of officers wearing tank crew uniforms. Markers for

detours around low-capacity bridges, for fords, and for sections of the highway where movement by tracked vehicles was permitted were installed on the roads.

Where there were no detours at bridges, the reconnaissance group gave instructions to the local authorities to set up detour roads and carry out bridge repairs. Meeting with the local populace, the officers explained the troop movement in the army zone toward the front in "careful" conversations.

Daily, from 6 through 15 July, on the established march routes three batteries of the 71st Detached Tank Destroyer Battalion and two batteries of the 1448th Self-Propelled Artillery Regiment feigned the movement of units on a special schedule developed by the operational group. The movement of artillery and self-propelled guns from the unloading station to the concentration areas was carried out in the daytime, mainly during morning flyovers by enemy reconnaissance aircraft. Some of the self-propelled guns were stopped in the road most often in populated areas. The tracks were deliberately removed or other defects were simulated.

In each populated area, the crews of the self-propelled guns and the other gun crews asked the local inhabitants for directions to the concentration areas even when the movement was not the first one conducted on the route. In addition, those asking directions were continually changed.

These subunits returned to the unloading station at night, with extinguished headlights, along country roads bypassing populated areas. To conceal the movement of these same self-propelled guns and artillery pieces, the numbers on the self-propelled guns and vehicles were changed daily, and, in some cases, the crews of the guns were changed.

At rest areas the self-propelled guns and artillery pieces, as a rule, stopped by the road and were carelessly camouflaged. Different rest areas were selected each time. Movement from these was begun toward the concentration areas, with a later change (bypassing populated areas) for the return march. A light repair detachment, a gas truck, and sometimes an armored car moved with the self-propelled guns. In addition, at night, a column of specially allocated vehicles with lit headlights moved toward the concentration areas. All vehicles going toward the front with non-urgent cargos were detained at a pass and control post on the military vehicle road. These vehicles formed columns and were dispatched along the march routes of the simulated tank army.

To intensify the light effect, 2 teams of 15 men each were allocated and equipped with flashlights. The soldiers, dispersed at a distance of 30 to 50 meters, moved along the route toward the concentration areas, turning on

the flashlights from time to time. When an enemy aircraft appeared, all lights were lit; when the enemy aircraft came close to the column, some of the lights were extinguished. After the aircraft had passed, the team boarded its vehicles and moved ahead 5 to 10 kilometers, where it continued its work.

The sound of moving tanks was produced with an MGU-42. At night, when the self-propelled guns were moved, a loudspeaker was left on the road and operated for 10 to 15 minutes, and was then packed up and moved on.³⁴ The break in its operation was filled with the noise of the moving self-propelled guns. In addition, collapsible tank mock-ups were installed on the march routes at night. This was done so that the enemy could detect the transfer of combat equipment if illumination bombs were used. By morning, five to seven mock-ups remained on the roads, simulating tanks left behind, along with two soldiers dressed in tank crew uniforms.

For the false concentration of a tank army, the army commander established 10 brigade and corps areas on a map. They were all reconnoitered. Simulated in these areas was the disposition of 6 tank brigades, a heavy tank regiment, 2 self-propelled artillery regiments, 14 artillery regiments, 8 tank destroyer artillery regiments, 3 antiaircraft regiments, 3 landing areas for U-2 aircraft with 2 aircraft in each, and an airfield for combat aircraft. The number of mock-ups included 453 of tanks and self-propelled artillery guns, 612 of guns of various calibers, 200 of vehicles, 95 of field kitchens, and 6 of U-2 aircraft.³⁵

In each concentration area, after setting up the mock-ups and rolling self-propelled guns and tractors through, a garrison was left to guard the area and make it appear real. Fires burned day and night. When enemy aircraft appeared, the garrison fired tracer bullets at them, and some of the fires were put out.

In concentration areas and on main march routes markers were set out with the numbers of staff field post offices and units of the 1st Guards Army and with the surnames of some commanders (for example, Viktorov's unit, and so on).

A false airfield was set up 2 to 3 kilometers east of Trifonovka. On 7 July, aircraft mock-ups were installed on it by forces of the 2d Air Army. Disposition of tank corps staffs was simulated near Rosokhach and Kobylets; in Soroki, the disposition of a tank army staff was simulated. Landing areas for communications aircraft were built not far from these populated areas, and mock-ups of antiaircraft guns were placed in position (an antiaircraft regiment at each point).

Allocated to simulate the communications of the concentrated troops were new RAF army radios, which had not yet been used on the air, and

two corps RSB radios. The army radios were installed at Soroki, and the corps radios at Dzurkiv and Kobylets. They were manned by signal personnel, who were not operating in this sector.

Because during preparation for the offensive the troops maintained radio silence, dissemination of false information by radio was conducted extremely cautiously. The radios established communications for the first time on 8 July and conducted a communications check; from 9 through 11 July, they did not broadcast at all, and only on 13 July did they begin to transmit.

On 18 July, with the completion of the concentration of troops and the start of simulation of their movement into the attack positions, the corps radios also moved forward, from Dzurkiv to Kamenka Velikaya, and from Kobylets to Pyadyki. The radios sent routine enciphered messages with five-digit groups, compiled at random by the operator officers. The beginning of the enciphered message (the address) and the end (registration number) were provided by cipher clerks in accord with the army's existing code. The number of groups in each enciphered message was always different. The wireless sets operated in normal sequence: call signs, communications check signals, and passwords were changed once a day, while frequencies were changed twice.

Besides the methods of disseminating false information in the army press mentioned above, articles were published on coordination between tanks and infantry, and pictures were often published of tank crews and their tanks.

During the time tank concentrations were being simulated, in the zone of the 18th Army measures were conducted to show preparation for an offensive. Thus, reconnaissance in force was conducted several times by forces up to a reinforced battalion. In the zones of the 226th, 24th, and 271st rifle divisions, reconnaissance was carried out by officers wearing tank crew uniforms and carrying identification cards stating that they were from tank units.

On 13 July an offensive with a limited objective was launched. It began in the Bogorodychin-Cheremkhuv sector with forces from the 226th and 24th rifle divisions of the 11th Guards Corps and with a regiment from the 161st Rifle Division of the 18th Guards Rifle Corps of the 1st Guards Army. The enemy put up strong resistance. In counterattacks, the enemy used up to a regiment of infantry supported by 15 tanks.

On 18 July 1944 the false troop concentrations were finished in all areas, and on the night of 19 July began the simulated movement of units to the attack positions: Zhukotsin, Liski, and Vishnevskiy. This was

finished on 20 July. In all, 84 collapsible tank mock-ups were installed in the attack positions. In addition, the 66th Guards and the 351st rifle divisions, artillery, and the 1448th Self-Propelled Artillery Regiment moved into this area. On the morning of 23 July, units of the 95th and 11th rifle corps went over to the offensive.

In response to our operational camouflage the enemy increased its air reconnaissance of the army's rear lines of communication, raising the number of daily air reconnaissance flights to 15 to 17, and showed greater interest in the concentration areas and unloading stations. On 12 July enemy aircraft bombed the Rosokhach and Vinograd area, which contained, except for tank and gun mock-ups, none of our units. On 15 July this same area was subjected to shelling by heavy artillery.

That the camouflage we conducted confused enemy reconnaissance is supported by evidence from prisoners.* According to their statements, German reconnaissance could not accurately establish the location of our tank armies because the tank echelons were moving both north and south. The enemy expected a large-scale offensive by Soviet troops in the Bogorodychi-Slobodka Lesna sector, and so, from 13 to 15 July, transferred the Hungarian 2d Tank Division there. On 20 July, in connection with the offensive of our troops on the Lvov axis, this tank division was moved to near Stanislav. During the simulation period, the 7th Infantry Division was moved from Hungary to near Nadvornaya and Delatin.³⁶

The enemy was also successfully disoriented on the right wing of the front. Here the main feature was that, because of a breakthrough of the enemy's defense, a gap developed south of the intended sector where the mobile troops were to be committed to action—near Gorokhov and Stoyanov—while the reinforced 1st Guards Tank Brigade—a forward detachment of the 1st Guards Tank Army with the mission of supporting the commitment to action of the main forces—was operating further north, on the Porytsk axis.

The command of the army group Northern Ukraine thought that the Soviet troops, having made major breakthroughs in a number of defensive sectors, would continue their offensive. "Since the 8th Guards Mechanized Corps and the 6th Motorcycle and Rifle Regiment have been sighted in the breakthrough at Porytsk," stated a report by the fascist German command, "we can assume that the enemy has brought the 1st Tank Army into action in this sector in full strength, assigning it an operational mission in depth."³⁷

* Paratroopers were dropped into the Ternopol area to determine the position of our tank armies (*Ministry of Defense Archives*, f. 236, op. 2698, d. 353, l. 17).

Thus, the enemy did not manage here to block the entry of our mobile troops into the breakthrough. This happened because the enemy was not able to discover in time the regrouping of the 1st Guards Tank Army, correctly assess the situation, and disclose the Soviet command's operation plan. The appearance of the 1st Guards Tank Army in the rear of Hitler's troops proved a complete surprise for them and forced them to make a quick withdrawal to the Western Bug River.³⁸

The entry of the 1st Guards Tank Army into the operational depth coincided with other important events in the zone of the 1st Ukrainian Front that determined the successful development of the operation as a whole.

On the Lvov axis, after overcoming great difficulties, the 3d Guards and the 4th tank armies entered the breakthrough by the Koltov corridor; a large enemy force was surrounded southwest of Brod.

In the situation at hand, the command of the army group Northern Ukraine came to the conclusion that the objective of the Soviet troops' main attack was undoubtedly Lvov. This, the command believed, followed from our effort to envelop the city from three directions. It was to be expected, stated a situation report by the army group, that the 1st Guards Tank Army would make an attack through Zholkev and that the 3d Guards and 4th tank armies would try to envelop Lvov from the north and south.³⁹

Our command assessed the situation differently. It thought that the enemy would try to hold the Sokal bridgehead, localize the offensive by the 1st Guards Tank Army, free the surrounded troops near Brod, and cut off from the other forces of the front and destroy the 3d Guards and 4th tank armies. Events confirmed the Soviet command's correct assessment of the situation.

In the operation under discussion other methods of achieving surprise were also employed. Widely known, for example, is the deep 120-kilometer maneuver march to envelop Lvov. The method of deception is interesting. As is well known, during the years of the Great Patriotic War there was a tradition of publishing the orders of the Supreme High Command when large populated areas and cities were seized. This usually took place on the day they were liberated. In the operation in question the order on the seizure of Peremyshl was purposely withheld: instead of on 27 July, when the city was taken, the information was transmitted on 29 July. This was done to convince the Hitlerite command that there had been no change in the strength of the force operating there. However, at that time the 1st Guards Tank Army was pulled out of the fighting; its formations, again secretly, made a 100-kilometer march and arrived at the Vistula on 30 July.⁴⁰

Consequently, the operational camouflage on the 1st Ukrainian Front was conducted successfully.

The enemy did not manage to detect the regrouping of the 11th Guards Tank Corps of the 1st Guards Tank Army on the Rava-Russkaya axis, of the 10th Tank Corps of the 4th Tank Army, and also of the 38th Army on the Lvov axis. The Hitlerites were not able to establish east of Ternopol the concentration of the 5th Guards Army, which became a part of the front on 13 July. The Hitlerites detected this army only toward the end of the operation, at the beginning of August, when it reached the western bank of the Vistula. With great delay, the fascist German command determined the strength and composition of our assault groupings, which forced it in the course of the operation to quickly create corresponding groupings of its own forces, transferring divisions from the Stanislav axis to do this.⁴¹ Evidence of the Hitlerites' error was their intensified clandestine intelligence to explain the grouping of tank formations on the left wing of the front. It is important to note the enemy's use of deception through radio communications, secret agents, prisoners of war, and the local populace.⁴²

Despite the difficult conditions, the command of the 1st Ukrainian Front managed to a considerable extent to keep its intentions secret; this had a positive effect on the development of the operation. "However, it must be noted," wrote Marshal of the Soviet Union A. A. Grechko, "that this effect could have been even greater if our reconnaissance had determined in good time the enemy's preparation for a counterattack on the Lvov axis and the composition of the forces that took part. This counterattack greatly complicated the breakthrough. It also drew in the main forces of our aviation and in doing so weakened our chances of preventing the maneuver of three German divisions from Stanislav to the Lvov axis and of two divisions to the Rava-Russkaya."⁴³

* * *

The Jassy-Kishinev operation was conducted by the troops of the 2d and 3d Ukrainian fronts in coordination with the Black Sea Fleet at the end of August 1944. The plan of Supreme High Command General Headquarters was to make attacks from northwest of Jassy and south of Tiraspol along converging axes to surround and destroy the enemy's Jassy-Kishinev force. The fronts were then to advance to Fokshany, Galats, and Izmail.

Operational camouflage was carried out to conceal preparation for the offensive and to disorient the enemy about the axes of the main attacks. Thus, on the 2d Ukrainian Front (commander, General R. Ya. Malinovskiy; military council member, General I. Z. Susaykov; chief of staff, General M. V. Zakharov) the concentration of an assault grouping was simulated on the right wing, on the Roman axis, where the highway

and main rail line passed. Sixty tank mock-ups and 400 gun mock-ups were positioned in this area, and reconnaissance of the enemy's defense was conducted intensively.

In addition, in the zone of the 40th Army, TNT was exploded to simulate fire from false fire positions, and increased night movement toward the front was simulated by motor transport with lit headlights.⁴⁴ On the right flank of the 7th Guards Army, in the Seret River-Kheleshtien sector, individual permanent fire positions were revealed and destroyed by fire from heavy artillery and direct-laying guns. This area (from which the artillery and equipment of the 27th Tank Brigade were withdrawn) was made to appear real by the movement of individual vehicles and operation of false fuel and repair points and radio sets, which simulated tuning and short communications checks. At night, the appearance of motor transport was created in the Kopeleu-Frumushik sector.

A concentration area of an assault grouping was simulated on the left wing of the front, in the zone of the 4th Guards Army. Thus, about 40 tank mock-ups were placed near Telenesht, and up to 60 near Pepen and Prepelitsa. In addition, on 13-19 August, from 2200 hours until 0500 hours, night movement of motor transport was simulated in the Kopachen-Baneshti Veki sector (toward Orgeyev) and in the Pepen-Prepelitsa-Baneshti Veki sector.⁴⁵

The 25th Camouflage Company and the 14th Assault Combat Engineer Brigade installed 350 tank mock-ups and about 1,000 gun and mortar mock-ups in the concentration areas.⁴⁶

To conceal the regrouping and the troop concentration areas on the axis of the main attack (of the 27th and 52d armies), front combat engineers, in 5 days on open terrain, installed 125 kilometers of vertical screens and 250,000 square meters of overhead screens and spotted 90,000 square meters of terrain in a zone 20 kilometers wide.

General A. G. Kravchenko, commander of the 6th Tank Army, was ordered to make up 150 tank mock-ups and leave them in the area occupied by the army before regrouping. It appeared that the 7th Detached Mechanized Corps had not left to join the 3d Ukrainian Front—in the area where it had been situated, tank mock-ups were left, camouflaged so that the enemy would notice them.⁴⁷

A large-scale troop regrouping was conducted in secret from the enemy. The mobile formations and 86 percent of the rifle divisions changed their dispositions. During the regrouping, units moved only in darkness. The electric bulbs were removed from the headlights on all tanks, trucks, and tractors. Specially allocated army staff officers served on the

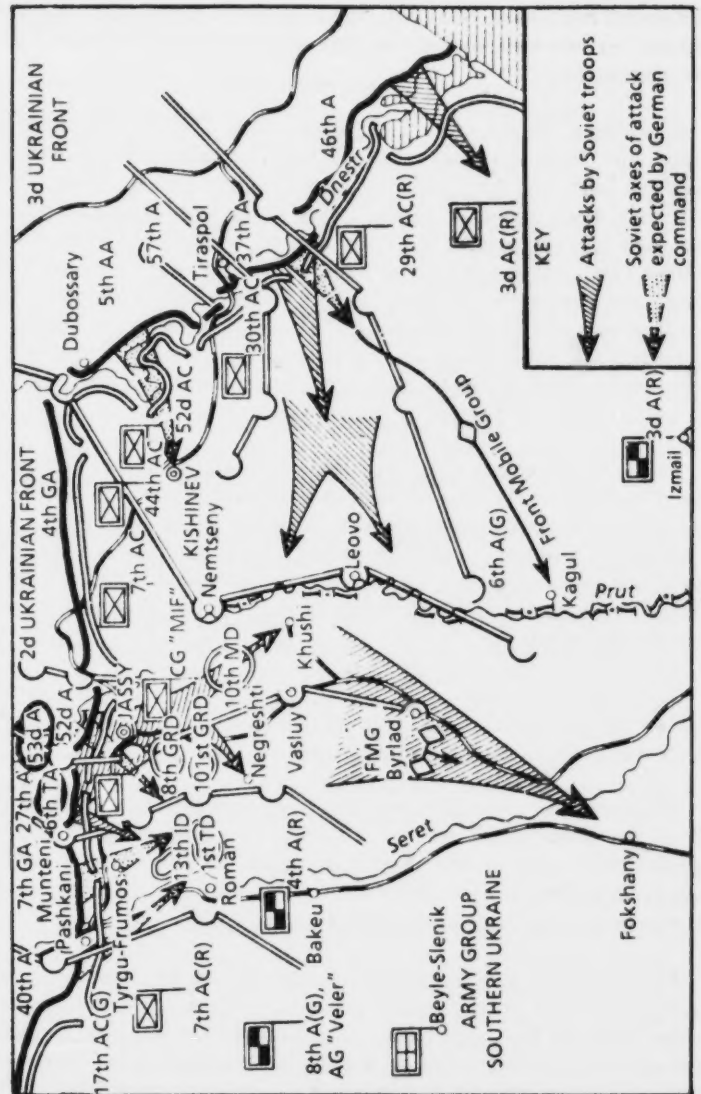


Figure 8. Jassy-Kishinev operation (August 1944).

roads and crossings, keeping order and supervising the blackout. By day, they conducted flyovers of the concentration areas and inspected the troops' camouflage during halts.⁴⁸

The construction of underwater bridges was of great importance in disorienting the enemy. The troops of the 2d Ukrainian Front built several of them on the Prut and Seret rivers. Marshal of the Soviet Union R. Ya. Malinovskiy, the commander of the front, noted in his memoirs that "underwater bridges proved themselves well, especially in muddy rivers. Enemy aircraft could not detect such bridges. So, of course, if the enemy could not find our crossings at once, it would look for them persistently and would finally discover them. Surface bridges then had to be built to draw the enemy's attention."⁴⁹

That the enemy did not manage to disclose the regrouping of our troops and that the simulation of the main assault grouping on the wings of the front achieved its goal is indicated by the fact that, during preparation for the operation, enemy aircraft did not bomb the units and formations of the 2d Ukrainian Front on the axis of the main attack, with the exception of the night of 19 August, when the enemy dropped a bomb load on the second echelons of the 52d Army after making about 110 flights.

The Hitlerites managed to accurately establish the axis of the main attack of the 2d Ukrainian Front just 1 day before the start of the operation. But in the last war, it was impossible to take countermeasures in such a short time.

It was considerably more difficult to conduct operational camouflage on the 3d Ukrainian Front (commander, General F. I. Tolbukhin; military council member, General A. S. Zheltov; chief of staff, General S. S. Biryuzov).

The front made the main attack with formations of the 57th and 37th armies and part of the forces of the 46th Army from the bridgehead south of Bender. As the experience of the war demonstrated, an offensive from a bridgehead determines the operation plan to some extent, and often reveals the axis of the main attack, thus reducing the role of the element of surprise. The enemy usually concentrates its reserves in front of a bridgehead and creates a strong defense with a great density of troops.

The staff of the 3d Ukrainian Front worked out a detailed operational camouflage plan, which was successfully put into practice. An assault grouping was simulated on the right wing of the front on the secondary, Kishinev axis. The grouping, in the zone of the 5th Assault Army, was made up of rifle and mechanized corps and a breakthrough artillery

division, which were situated at Karmanovo, Grigoriopol, and Tashlyk, respectively.

In the false concentration area 5,305 various shelters and 104 depots were built, and 514 mock-ups of tanks, self-propelled guns, artillery, mortars, and vehicles were installed.⁵⁰ Tanks, guns, vehicles, and infantry were moved from the real concentration area toward the false one, primarily before the coming of darkness, to create the impression of a massing of troops during the hours of darkness. At night, they returned. A reserve rifle regiment, an engineer brigade, and 2 engineer construction battalions were left in the false area. They intensively simulated the disposition of newly arrived formations. In violation of the rules, specially allocated radios broadcast meaningless signals, as if by accident.⁵¹

In 43 days, about 200,000 man-days were expended and a great quantity of various materials was used to equip and service the false area and to make it appear real. An average of 162 vehicles and 200 two-horse wagons were used daily for work and the transport of materials.⁵²

The execution of the operation's smoke support plan, approved by the front military council, played a large role in conducting operational camouflage.⁵³ Thus, on a secondary axis in the zone of the 5th Assault Army, a smoke screen was laid on the front through Okhrancha-Ustya, Pogreby, Dorotskoye, Grigoriopol, Poguchen, and Kalfa to distract the enemy's attention. In addition, a diversionary smoke screen lasting 4 hours was created in the zone of the 46th Army on the Troitskiye Sady-Korkmaz line. During enemy air raids, forces of the 38th Detached Chemical Protection Battalion and a platoon of the 9th Technical Company covered the bridges across the Dnestr near Sukleya, Karagash, and Slobodzeya with smoke.⁵⁴

The front staff conducted a series of measures to protect military secrets. Special numbers were assigned to all subunits simulating line units. Rifle division staffs were simulated. The transmission of regular reports by telephone was conducted with a special code. Radios under the front command sent coded training telegrams. The stations' call signs and locations were changed every 24 hours. Barriers and checkpoints were installed on all roads leading to subunit dispositions. Two-man patrols patrolled the camps around the clock. Contact with the local populace by the soldiers was cut to a minimum. Commanders and political workers conducted intense explanatory work among the personnel on protecting military secrets.⁵⁵ A specially allocated group of officers spread false rumors about the concentration of troops and their combat mission.

Of special concern to the front staff and to the staff of the 5th Assault Army was the creation of a false troop concentration area and the disposition in it of weapons and rear service installations and objectives.

Trenches, lines of communication, fire positions, observation posts, and artillery positions were set up according to the working plans for real installations, but excavations were carried out to a depth of only 15 to 20 centimeters. From time to time, a real gun was moved into a false position. The gun was fired several times, for ranging fire, and moved to another position. Field kitchens gave off smoke at the edges of groves and in hollows. Field hospitals were "set up" on the outskirts of populated areas. Specially detailed soldiers portrayed the sick and wounded. The movement of units from the rear to the front was simulated by several vehicles with large branches fastened to the sides. These vehicles raised dust on the country roads. At night, several vehicles periodically switched on headlights and created the illusion of movement of motor transport columns to the front.⁵⁶

The entire false troop concentration area was reliably covered by antiaircraft artillery and aircraft. The antiaircraft crews opened intense fire on enemy aircraft, and fighters attacked them. This made enemy reconnaissance difficult and impressed the enemy with the importance of the objective being guarded. Reconnaissance in force was actively conducted on the secondary axis. Aircraft of the 17th Air Army periodically attacked the enemy defense.

The combat operations of the Black Sea Fleet and of the Danube Military Flotilla contributed to the success of the offensive.

The plan was to conduct the combat operations of the Danube Military Flotilla in two stages and hidden from the enemy. The first stage called for crossing the Dnestr estuary at a breadth of up to 12 kilometers on the night of 22 August; the second stage called for a breakthrough by the ships of the flotilla at the mouth of the Danube and further upstream.

The landing of the main assault forces was to be carried out by two assault detachments, for which the most advantageous loading and landing points were indicated. For the first detachment, the loading point was planned near Kalagleya, and the landing point near Mologa; for the second, the loading point was near Roksolany, and the landing point near Shabo. The main axis was Kalagleya and Mologa, and the secondary, Roksolany and Shabo.

To disorient the enemy about our crossing from Kalagleya and Roksolany, an assault landing was feigned near Bugaz. For this purpose, part of the forces of the 1st Guards Fortified Region were to cross a branch of the Tsaregrad River.

The air force of the Black Sea Fleet provided air support for the preparation and conduct of the assault.

To conceal the operation, the decision was made not to conduct artillery preparation. However, a call for artillery fire was provided for if requested by the assault commanders.

The assault order took into account camouflage and deception of the enemy. The first assault echelon, headed by assault groups reinforced with combat engineers, crossed in landing craft with oars. The next assault echelons, with antitank artillery and mortars, followed on crossing equipment towed by hydroplanes and began landing 15 to 20 minutes after the first echelon.

Artillery, weapons, and all types of transport equipment were ferried across after bridgeheads were seized on the opposite bank.

In addition, a detachment of breakthrough ships was to be formed to provide sea support for the assault and the crossing of the Tsaregrad River. Securing the passage of this detachment through the Tsaregrad River was charged to artillery support ships (four armored gunboats). They were to suppress the fire positions near Bugaz covering the entrance to the Tsaregrad River, and were also to feign a landing on the Bugaz spit.

To disorient the enemy, aircraft and ships of the Black Sea Fleet attacked enemy naval bases and airfields during the assault operation. Thus, on 20 August, 200 aircraft of the Black Sea Fleet made a concentrated attack on enemy ships at Konstantsa. Simultaneously, 48 aircraft carried out a raid on enemy craft at Sulin and on a branch of the Sulin River. The raids destroyed and damaged many enemy ships and smaller craft. The air attacks forced a considerable number of enemy fighters to operate near enemy naval bases. The fascist German command could not send the required number of aircraft to the Dnestr estuary, and so could not detect our preparation for the assault.

Crossing the Dnestr estuary required careful and secret training and instruction of the personnel. Selected for this purpose were the Khadzhibeysk and Sukhoy estuaries near Odessa, which were similar to the Dnestr estuary navigationally. The troops trained in these estuaries for several days.

Because of the concealment, the enemy did not notice the crossing of the estuary until the forward detachments were approaching the western bank. At dawn on 22 August, the troops seized the bridgehead, and during the day the entire shoreline.

Much camouflage work was also conducted on the axis of the main attack of the 3d Ukrainian Front. Thus, at the bridgehead south of Bender, a dense network of trenches and lines of communication was created (up

to 19 kilometers of trenches and lines of communication for each kilometer of front).⁵⁷ This made possible not only a considerable reduction in personnel losses from artillery fire and enemy air attacks, but also provided the opportunity for a secret regrouping and occupation of the attack position for the offensive.

All movement was ceased at the bridgehead on the Tiraspol-Parkany, Tiraspol-Maleshti, and Kitskan-Fl. Valeytany roads. The staff of the 37th Army (commander of the army, General M. N. Sharokhin; military council member, General V. D. Shabanov; chief of staff, General A. K. Blazhey) inspected the camouflage daily. Day and night there were officer posts, which oversaw the camouflage, on the troops' main traffic routes.⁵⁸

False crossings were laid over the Dnestr along with the permanent ones. Bridges and crossings were built and operated after dark; by day, floating bridges were raised and camouflaged.

Movement of troops to the bridgehead and their occupation of the attack position for the offensive were conducted strictly according to plan, at night, and blackouts and sound masking were observed. A control service was organized at the bridgehead.

Operational camouflage was carried out so effectively that the enemy continued to keep the main forces of its 6th Army on the Kishinev ridge opposite the 5th Assault Army. This contributed to the achievement of success during the breakthrough of the fascist German defense from the bridgehead south of Bender, where the front's main attack was made.

As S. S. Biryuzov, the former chief of staff of the 3d Ukrainian Front, recalled, "Everything was done carefully. . . . We had the opportunity to make sure that all of the operational camouflage was fully justified. The enemy continued to expect the main attack on the Kishinev axis, not only during the breakthrough of its defense, but even on the second day of our offensive. Only by the end of the second day of bitter combat did the enemy understand the full tragedy of its position."⁵⁹

This was also confirmed by documents from the fascist German command. In the German 6th Army's combat operations journal of 7 July 1944 was written: "The Red Army's summer offensive against Army Group Center, and the completed concentration of enemy troops against the Northern Ukraine army group, . . . confirmed that the enemy had put off plans for an offensive toward Balkany."⁶⁰ Even 5 days before the start of the operation, the enemy was still convinced that such an offensive was not likely, which is indicated by a document from the General Staff of the German ground forces from 15 August.⁶¹

Because of the successful combat operations, the Soviet troops completed the encirclement and destruction of a large enemy force, the Southern Ukraine army group. In 10 days, the enemy lost 18 divisions. Soviet troops captured 208,600 enemy soldiers and officers. The Moldavian SSR was fully liberated, and Romania was out of the war as an ally of fascist Germany. Favorable conditions were created for the liberation of Bulgaria and for an offensive toward Hungary and Yugoslavia.

* * *

The Memel operation was conducted by the 1st Baltic Front in October 1944. Its success was furthered considerably by operational camouflage: the regrouping of large masses of troops from Riga toward Memel was concealed, and the enemy was disoriented during preparation of the operation.

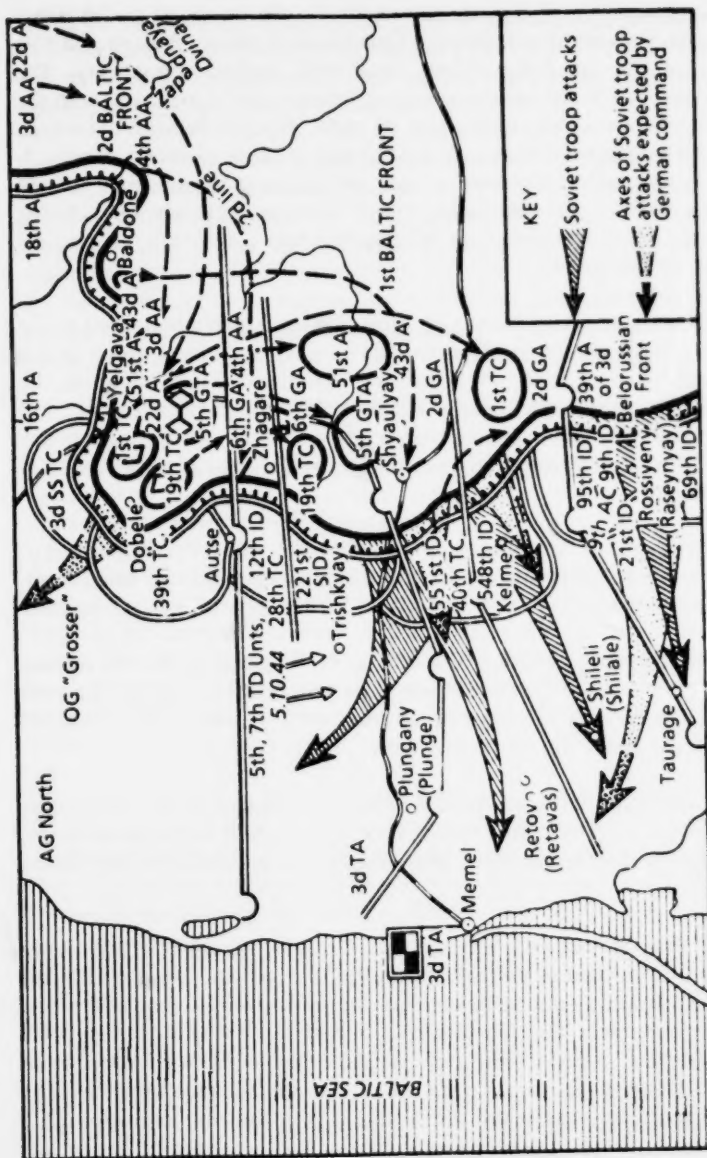
At the start of the second half of September 1944 the troops of the 1st Baltic Front were to destroy the enemy bridgehead on the left bank of the Western Dvina and were then to seize Riga and cut off the enemy's Riga grouping with an advance to the Gulf of Riga. To localize the offensive of the Soviet troops, the Hitlerites concentrated many of the forces of Army Group North (the 16th and 18th armies and part of the 3d Tank Army) on the Riga axis, thus greatly weakening the defense on the Memel axis.

After assessing the situation, Supreme High Command General Headquarters ordered the commander of the 1st Baltic Front, General I. Kh. Bagramyan, to switch his main efforts from the Riga axis to the Memel axis, and, with a surprise attack from near Shyaulyay, to break through the enemy defense and advance toward the Baltic Sea near Memel, thereby cutting off from East Prussia the entire Baltic grouping of fascist German troops.

From 24 September to 4 October, four combined arms armies (the 4th Assault and the 43d, 51st, and 6th Guards), a tank army (the 5th Guards), several formations, and a mass of artillery and other reinforcements were successfully regrouped, unnoticed by the enemy, at a distance of 60 to 200 kilometers; this was comparatively close to the enemy.

At the same time, the front command tried to impress on the fascist German command that we were planning an offensive operation on the Riga and Tukums axes.

With this goal, the front commander approved an operational camouflage plan in which considerable attention was given to disorienting the enemy (Appendix 6).



To designate a false troop concentration, the troops of the 2d Baltic Front, having arrived to relieve the formations of the 4th Assault and 51st armies of the 1st Baltic Front, conducted daytime movements. The withdrawal of the relieved units was carried out only at night and with the strictest observance of camouflage. At night, from 28 September through 3 October, fires were lit near Klapi, Urasa, Bizdeni, Grimasa, Gertsogi, Bruveri, and Lachi; there were as many as 720 just in the defensive zone of the 51st Army. These areas were covered by antiaircraft weapons. During enemy air raids, the fires were extinguished and the antiaircraft gunners conducted intense fire.

Bringing up forces (from a company to an infantry battalion) to the forward edge was simulated in the daytime in the defense zones of the 346th, 267th, and 204th rifle divisions. With the coming of darkness, the subunits that had arrived were withdrawn. Movement of motor transport toward the divisions' combat formations was simulated during the day (four times, 20 to 25 vehicles) and at night (twice, 15 to 20 vehicles with lit headlights).

In the zone of the 10th, 1st Guards, and 60th rifle corps, movement of vehicles with lit headlights was increased at night from the rear to the front. In daylight, movement from the front to the rear was kept to a minimum.

An observation balloon was sent up in the sector of the 4th Assault Army south of Bausk. One 203mm gun battery and three M-31 rocket launchers were left in the zone of each army; these pieces conducted ranging fire under the established plan.

Some of the radios of the 43d, 51st, 4th Assault, and 5th Guards tank armies, and of the 1st and 19th tank and 3d Guards Mechanized corps, were left in the former areas and operated in the sequence established earlier.

To simulate the false preparation of troops for the offensive, commanders of formations and units conducted reconnaissance in the Plades, Vetsenesi, Sensava, and Vaotas sectors and in the defense zone of the 51st Army. For example, the commanders of the 347th, 346th, 267th, and 204th rifle divisions, together with rifle regiment commanders and groups of officers (four to six men), conducted 12 reconnaissance missions. The regimental commanders and the battalion commanders conducted 20.⁶² Each night, listening sentries went to the forward edge of the enemy defense—one pair for each kilometer of the front.

Reconnaissance searches were conducted in the zone of the 51st and 4th Assault armies on 28–30 September from 2200 to 0500. Reconnaissance in force was conducted in one of the sectors of the 4th Assault Army

by a rifle battalion supported by two artillery battalions. In the 4th Assault and 51st armies each, four or five artillery battery fire positions were set up. Throughout the defense zone of these armies, roving guns conducted intense ranging fire from false fire positions.

In the 51st Army, fire positions for the battalion artillery were selected and equipped in areas occupied earlier by subunits of the 60th and 55th howitzer artillery brigades. The 120mm mortars of the rifle regiments (one from each unit), roving through the fire positions abandoned by a mortar regiment, simulated the concentration of a large mortar force. The guns of the regimental artillery continued to conduct fire from open fire positions on known targets. Every day, each battalion artillery gun expended 8 to 10 shells, and each mortar 10 to 15 projectiles, on a single target.

The 151st Army Cannon Artillery Brigade, using the roving guns of the cannon artillery division, conducted ranging fire of air registration points. M-31s periodically moved to reserve areas and conducted volleys against enemy personnel and equipment. Observation posts abandoned by artillery units were fit out completely.

Army combat engineers installed 334 tank mock-ups near Livany, Buchas, Betyni, Romas, and Bruveri. Tank movement was simulated four times into concentration areas in the Seglini, Klayn-Veveri, and Stoti sectors during daylight on 30 September—2 October. Concentration of combat equipment near Budy and Lipini was feigned in the 51st Army with 20 tank mock-ups, which were moved by tractors and tanks of the 174th Detached Evacuation Company.

To disorient the enemy, friendly and enemy minefields were cleared, and passages were made in wire obstacles. Combat engineer groups of 10 to 12 men operated in each rifle regiment of the first echelon. Concentration of pontoon equipment was simulated southwest of Baldone and Mitava by forces of the 9th Pontoon Bridge Brigade.

The 3d Air Army attacked enemy strongpoints at Tukums, Tekava, and Sloka.

False information about the offensive was organized in the zone of the 4th Assault and 51st armies. Instructions on preparing for the offensive were sent by radio, by a special code, under a plan developed earlier. For this purpose, the staffs of the armies, corps, and divisions allocated one RB radio each, which operated from 28 September through 4 October. "Verification" of troop preparation for the offensive was also carried out by wire communications under a plan developed earlier.

"Reinforcing the defense" and camouflaging the real preparation for the offensive on the Shyaulay axis was conducted along with the

"increased preparation" for the offensive on the Riga and Tukums axes. The troops in the defense dug second and third trenches, conducted false mining of the forward edge, and removed the operational mines before the offensive and replaced them with false ones. All artillery fire positions were camouflaged.

These measures brought increased reconnaissance by the enemy on the Riga and Tukums axes. The Hitlerite command told the soldiers that the Russians had concentrated large infantry forces and tanks in this sector of the front for going over to the offensive. Throughout the sector methodical artillery fire intensified and the number of fire attacks on the false concentration area of our men and equipment increased.

Northwest of Dobeles the fascist German command tightened the combat formations of its troops by moving units of the Netherlands SS Motorized Division, which had operated on the Leningrad Front, to the forward edge, and concentrated the 7th Tank Division in the second echelon on this same axis.⁶³

The operational camouflage conducted by the front played a large role in the successful conduct of the operation. It is evident from the combat operations journal of Army Group North for September and October 1944 that the enemy expected the offensive of the Soviet troops in the Dobeles and Yelgava (Mitava) sector. On 26 September the commander of Army Group North, General Sherner, reporting to Hitler, categorically maintained that "the enemy is removing troops from separate axes for infantry reinforcement of the attack sectors of its tank units west of Yelgava (Mitava) in order to go over to a general offensive soon."

On 28 September Sherner was called to Hitler's headquarters where he received the mission of preparing to go over to the counteroffensive from near Rasejnyay toward Sheduva and Shyaulayay, attacking the front and rear of the Soviet troops' Riga grouping (operation Blitz). Readiness for the offensive was to be completed by mid-October.

On 2 October the commander of Army Group North, alarmed by reconnaissance information about the increase in movement of Soviet troops near Shyaulayay, met with General Rausch, the commander of the 3d Tank Army. Rausch reported that the large-scale enemy troop regroupings being conducted at the time indicated the Soviet Command's operational plans: to destroy Army Group North with an attack from the south toward Memel. He thought that the main attack would be made south of Shyaulayay, where there were two assault groupings near Rasejnyay and east of Kelme, and that the operations of the latter could be restricted by seizing Kelme. A third assault grouping was concentrated northwest of Shyaulayay.

The big enemy offensive should be expected in 14 days, and strong local attacks, preparing the way for the offensive, were possible now.

Sherner agreed with the assessment of the situation. His opinion was reflected in the staff report of the army group to the staff of the high command of the ground forces. It was reported in this document that the regroupings in the enemy's disposition had been halted and a new sector for the main attack was taking shape near Shyaulyay.

On 5 October the troops of the 1st Baltic Front went over to the offensive, and only during the battle that unfolded did the German command finally manage to determine the scale of the offensive operation, its decisiveness, and the axis of the main attack. On this day, the staff of the 3d Tank Army made a conclusion about the large-scale offensive of the Russians, who were making the main attack northwest of Shyaulyay, and, on 6 October, the commander of Army Group North took urgent measures to transfer units of the 39th Tank Corps from near Riga toward Memel.

However, the enemy's reinforcement of the Memel axis was too late. The defense of the 3d Tank Army collapsed under the strong surprise attack of the Soviet troops. On 10 October the troops of the 1st Baltic Front advanced to the shore of the Baltic Sea north and south of Memel.⁶⁴

* * *

The operational camouflage in the operations of 1944 greatly determined the success of our troops' combat operations. New features of this camouflage were the simultaneous operations by several fronts, the great scope of the camouflage, the conduct of reconnaissance in force on a wide front, and the stricter camouflage discipline and tighter control over the conduct of camouflage by the staffs of the front, army, and branches of troops.

The experience of conducting camouflage in 1944 showed once again that with careful preparation and active execution camouflage provides good results. To increase the effectiveness of operational camouflage, troops should be more widely enlisted and needed equipment more broadly allocated. Ten percent of the combat equipment and weaponry must be allocated for each type of mock-up to make concentration areas for false equipment appear real.

In 1944 the troops gained experience in conducting the operational camouflage of an offensive begun from a limited bridgehead. Although the bridgehead to some extent determined the plan of the operation and the selection of the main axis of attack, and significantly reduced the role of the elements of surprise, the command of the 3d Ukrainian Front

managed to disorient the enemy and achieve surprise in the Jassy-Kishinev operation.

The experience of conducting operational camouflage was instructive in the Memel operation, when, during the offensive, the command of the 1st Baltic Front managed, secretly from the enemy, to regroup large masses of troops from the Riga operational axis to the Memel axis.

The combat operations in the 1944 campaigns convincingly showed that the success of operations on coastal axes depended greatly on the operational camouflage conducted in the fleets and flotillas.

The construction of underwater bridges in August 1944 on the 2d Ukrainian Front was highly effective.

The experience of conducting artillery preparation to deceive the enemy deserves attention. In the middle of the artillery preparation on the axis of the main attack of the 3d Ukrainian Front (August 1944), the artillery and mortar fire was shifted to the depth of the enemy defense. At this time, the troops of the first echelon, simulating an attack with dummies, intense rifle and machine gun fire, and shouts of "hurrah," forced the Hitlerites to abandon their shelters and occupy trenches to repel the attack, while our artillery again shifted its fire to the first trenches and struck the enemy.

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31. *Ministry of Defense Archives*, f. 236, op. 2698, d. 353, I. 9.
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33. *Ministry of Defense Archives*, f. 236, op. 2698, d. 353, I. 17.
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Chapter 4. Operational Camouflage in the Operations of 1945

In the European campaign of 1945 the troops of the 1st and 2d Belorussian and 1st Ukrainian fronts made the main attack in the central sector of the Soviet-German Front on the Warsaw-Berlin axis. A large enemy grouping had operated in front of them since summer 1944. Supreme High Command General Headquarters decided to weaken this enemy grouping and took measures to disorient the fascist command about the true intentions of the Soviet troops. The Red Army conducted offensive operations on the flanks of the Soviet-German Front for the invasion of East Prussia and Hungary. In October-November 1944 the Hitlerites had to transfer large forces to these areas (especially to Hungary) from the front's central sector and from the reserves. In December 1944 the fascist German command was convinced that, in the winter of 1945, the Soviet Armed Forces would attack in Hungary, southern Poland, and East Prussia. In the central sector of the Soviet-German Front, the Germans expected a Soviet troop offensive with a limited goal. Not until several days before the start of the powerful Red Army offensive in January 1945 did the enemy detect the concentration of large forces of Soviet troops on the Vistula, but countermeasures could not be taken in such a short time. An attack of unprecedented strength was brought down on the enemy completely by surprise. "It is impossible to describe everything that took place between the Vistula and Oder in the first months of 1945," wrote former German army general F. Mellenthin. "Europe had known nothing similar since the fall of the Roman Empire."¹

The Vistula-Oder operation was one of the largest strategic offensive operations of the Great Patriotic War. It was conducted in January 1945 by troops of the 1st Belorussian and 1st Ukrainian fronts. They were aided by troops from the left wing of the 2d Belorussian Front and from the right wing of the 4th Ukrainian Front.

The 1st Belorussian Front made the main attack from the Magnushev bridgehead toward Poznan, and a second attack from the Pulawy bridgehead toward Radum and Lodz. A secondary attack (with forces of the 47th Army) was made north of Warsaw.

The troops of the 1st Ukrainian Front made a single powerful attack from the Sandomierz bridgehead in the general direction of Breslavl.

During the preparation of the Vistula-Oder operation the troops of the 1st Belorussian and 1st Ukrainian fronts conducted much deception to conceal the scale of the coming offensive and the axes of the main attacks.

By order of General Headquarters, the commander of the 1st Belorussian Front was to show preparations for a false operation to attract the attention of enemy reconnaissance, and, if possible, part of the enemy forces as well. The area selected for the false operation was the most extreme sector of the left wing, at the junction with the 1st Ukrainian Front. Camouflage, as Marshal of the Soviet Union G. K. Zhukov wrote, was coordinated with the General Staff and approved by General Headquarters.²

The commander of the 1st Belorussian Front decided to show the concentration of armored and mechanized field forces, combined arms formations, and a great mass of artillery, aircraft, and engineer troops on the false axis, as well as an increase in rail and truck transport. For this purpose, about 1,000 mock-ups of tanks and self-propelled guns and hundreds of vehicle mock-ups were built. This mass of "tanks" and "vehicles" was provided with some of the radios of the 1st and 2d Guards tank armies, which were well known to the enemy from their operations.

Several dozen specially allocated real tanks and vehicles showed the movement of armored and mechanized troops. Engineer troops built new bridges, repaired old ones, and equipped and repaired transport roads. Several hundred aircraft mock-ups were used to feign a concentration of aircraft, and dozens of combat aircraft were used to make the concentration appear real. Airfields were built, and air reconnaissance and aerial photography were increased in the enemy's tactical and operational zones.

All of this was shown to the enemy sequentially, in different places, under a plan developed earlier to regroup and concentrate the troops to make our operations appear completely real to the enemy.

As a result, the fascist German command was convinced that it was precisely in this area that a large-scale offensive operation was being prepared. The Germans regrouped a tank and a motorized division here to the left wing of the 1st Belorussian Front, weakening their defense on the axis of our main attack. With the shift of the Soviet troops to the offensive, these divisions fell under a double envelopment by flank groupings of the 1st Belorussian and 1st Ukrainian fronts.³

Total calm was maintained and defensive work was feigned in the center of the 1st Belorussian Front, where the real offensive operation was being prepared. All railroad echelons with tanks and artillery on the approach to the army's rear areas were camouflaged as shipments of hay

and building materials. These echelons were unloaded only at night or in heavy fog. After the artillery was unloaded, the tanks were quickly withdrawn to previously prepared areas. The trails made by tank tracks were camouflaged before dawn, and the railroad empties were moved off and dispersed in the front's rear area. Troops were brought up to the front at night, bypassing large populated areas. Engineer work in the attack position for the offensive was also conducted only at night; before dawn, all that had been done was carefully camouflaged. Staff officers inspected the quality of the camouflage during a flyover of the area.

The control service and traffic service were well organized. Before dawn, any troop movement ceased, except for isolated vehicles. Supplies being transported, vehicles, artillery pullers, and so on, were all dug in and carefully camouflaged.

Development of all plans in the army and front staffs was conducted by a tightly restricted group of officers and generals to keep operation preparations in strictest secrecy. Nobody was given written documents: only oral commands were used. The front's directive to the armies on the offensive was given out several days before the start of the operation. Formation commanders orally assigned missions to unit commanders 4 to 5 days before the operation. Battalion and company commanders were acquainted with their combat missions 2 to 3 days before, platoon leaders a day before, and soldiers and non-commissioned officers—several hours before the attack. Reconnaissance in force was conducted on a wide front 5 to 6 hours before the start of artillery preparation.⁴

Air defense units were permitted to open only weak fire on enemy aircraft. They were forbidden to fire on single targets or small groups, or even on aircraft flying at moderate altitudes.

Roughly this same large-scale operational camouflage was conducted on the right wing of the front to give the enemy the impression that large forces were being concentrated against Warsaw.

The operational camouflage conducted on the 1st Belorussian Front was effective. The command managed to achieve operational surprise and to conceal from the enemy the scale and start of the offensive operation.

On the 1st Ukrainian Front, operational camouflage was conducted on the left wing, where the main attack was simulated.

The operation plan called for breaking through the enemy defense from the Sandomierz bridgehead in the Rakuv-Metel sector and for making the main attack in coordination with the troops of the 1st

Belorussian Front toward Khmelnik, Malogoshch, and Radomsko to defeat the enemy's Keltse-Radomsko grouping.

On 21 December 1944 Marshal of the Soviet Union I. S. Konev, commander of the 1st Ukrainian Front, after deciding to deceive the enemy about the real concentration of troops and the location of the breakthrough of the front, ordered:

"Before starting active operations to break through the enemy defense, create a false concentration of a tank army and a tank corps on the front's left wing in the sector of the 60th Army, near Ropchitse, Otseka, and Dembitsa.

"Use the forces of the army to conduct operational camouflage as quickly as possible (no more than 5 to 7 days); for this, the 4th Guards Tank Corps will be enlisted for 2 to 3 days in the zone of the 60th Army. The corps will then make a lateral move into the real concentration area and leave behind tank and artillery mock-ups in the temporary dispositions.

"Operational camouflage should be distinguished by exceptional realism; to achieve this, tank formations must be enlisted for short periods to make use of their movement.

"False concentrations should be combined with and directly linked to the real concentration."⁵

In accord with this order and the front's operational camouflage plan, the military council of the 60th Army approved the instructions for carrying out the operational camouflage plan in our troops' zone of operations. Detailed plans were compiled in the army for camouflage of the artillery's entry into concentration and deployment areas and for artillery ranging fire. Careful planning and efficient organization of operational camouflage on a front and army scale contributed to deceiving the enemy about the intent of the operation.

To guide the camouflage operation, an operational group was created from representatives of the branches of troops: the chief of the group (who was deputy chief of the operational department of the army staff) was Colonel Samoylov; from the commander of artillery came Colonel Bur-nizyan and Major Kiselev; from the commander of the armored and mechanized troops came Major Tatnev; from the communications department came Major Pyanov; from the engineer department came Colonel Varkhotov; and from the political department came Lieutenant Colonel Milkhiker.

The following were allocated to execute the camouflage work: from the front, the 77th and 78th combat engineer battalions of the 16th Detached Assault Combat Engineer Brigade and the 22d Detached Camouflage Company; from the army, a combat engineer battalion from the detached combat engineer brigade, up to 2 battalions of the 177th Army Reserve Rifle Regiment, a rifle battalion from the 908th Regiment of the 246th Rifle Division, 10 vehicles from the 106th Rifle Corps, 2 army loudspeakers, 15 billeting-party members (army officers), 200 collapsible tank mock-ups, a flight of fighter aircraft, 2 or 3 artillery battalions, 2 heavy artillery batteries for simulating ranging fire, up to 3 small-caliber antiaircraft batteries, and officer reconnaissance groups from the defending units.⁶

The camouflage operation consisted of three periods: preparation, feints, wrap-up. Preparation began on 21 December 1944, when the front staff order was received; feints lasted from 1 through 12 January, and the wrap-up from 12 through 15 January 1945.

During the preparation, road units and the local populace laid out march routes for tank traffic.

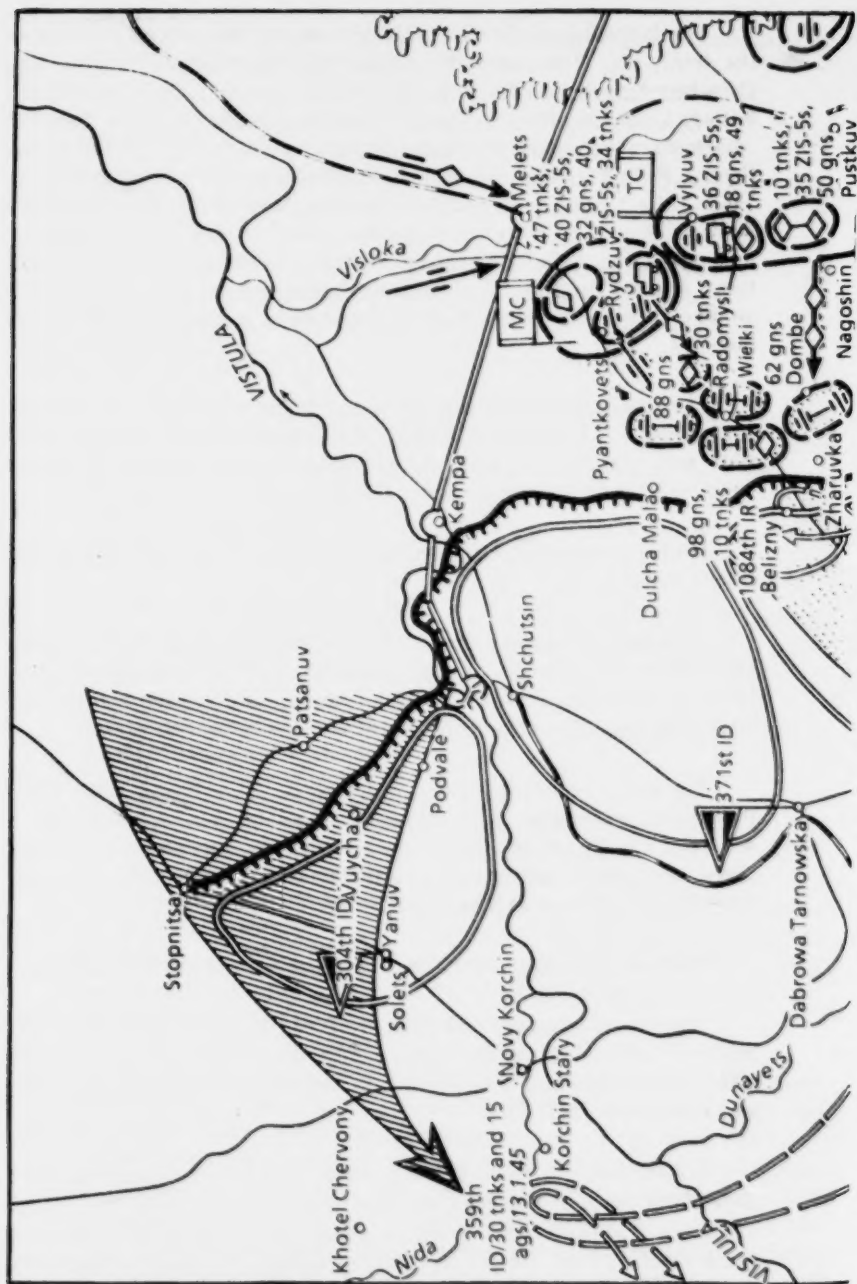
A specially allocated group of officers, dressed in tank crew uniforms, conducted reconnaissance of these march routes. The group gave instructions on the need to repair different sections of the march route and conducted deception during contact with the populace.

The army's road department, which prepared the route, was not told of the real reason for these measures. The work was conducted as it normally was during preparation for an offensive. Pits and craters in the roads were filled, landmarks and markers were set up, bridges were repaired, and detours were set up for tracked vehicles.

Unloading platforms were built at Ropchitse and Zavada stations.

Engineer units (army and front) prepared 150 T-34 tank mock-ups, 100 T-34 semi-mock-ups of boards and panels, 50 ZIS-5 mock-ups, 100 ZIS-5 semi-mock-ups, 480 76mm gun semi-mock-ups, and 120 152mm gun semi-mock-ups.⁷

Collapsible tank mock-ups were made from wire and sacking. Thick paper from captured sandbags was used instead of sacking on many of the mock-ups. The finished mock-ups, as a rule, were moved to the installation site at night. A chief, named from the officers of the engineer troops, was responsible for the timely and proper installation of the mock-ups in each false concentration area. The chief consulted with tank and artillery



officers and with the commander of the troops whose missions were to guard the false areas and to make them appear real.

On 1 January the staff of the 1st Ukrainian Front gave the signal to begin the feints. There had been no changes in the enemy grouping by this time. The enemy shelled our combat formations with methodical artillery fire. Low clouds, fog, and snow kept enemy aircraft out of the army zone. Therefore, the enemy conducted intensified ground reconnaissance.

The 60th Army, continuing its defense on the former line, regrouped according to plan toward the right flank. Since the enemy could not conduct air reconnaissance, and since there were no railroad flatcars (shuttles), corrections were made in the camouflage plan: feigning the rail transport and unloading of tanks was canceled.

Now, all operational camouflage was designed to deceive enemy intelligence.

Therefore, during daylight on 27 December 1944, the 4th Guards Tank Corps arrived in the army sector; on the night of 29 December it left in a northwesterly direction toward the real concentration areas and the bridgehead. At all places where units of the tank corps made temporary halts, mock-ups of tanks, artillery, and vehicles were installed.

By the evening of 3 January, 462 mock-ups were installed in different areas: 100 tanks, 312 guns, 50 vehicles.⁸

At the same time that the mock-ups were put in place, work to make the false areas appear real was conducted: groups of people moved by day, and fires were lit at night. The mock-ups frequently were placed in sectors where they were easily seen from the roads. In these sectors, simulation and work to make the areas appear real were conducted especially scrupulously. Sectors with mock-ups of equipment were carefully guarded.

The simulation teams allocated to guard the areas and to make them appear real were subordinate to the area chief. An operational group of three front staff officers had control over the simulation.

The calculation about enemy intelligence was justified. Four days after the mock-ups were installed, the enemy conducted an artillery attack on the area south of Zavada, 6 kilometers from the forward edge of defense.⁹

The work to make the artillery positions appear real—there were about 600 mock-ups in these positions by the end of the simulation

period—was carried out under a special plan by ranging fire from roving guns.

The advance of the tank mock-ups to the attack line—that is, the simulation of a group of infantry-escort tanks—was canceled by a special order, because such groups had not been created throughout the sector of the offensive in preparation.

To deceive the local populace, groups of billeting-party members operated near Otseka, Pshetslav, Sendzishuv, and Dembitsa on 3-6 January. They warned the residents of their supposed coming evacuation from the populated areas intended for the billeting of the arriving tank units.

On 1-4 January roving guns and mortars conducted ranging fire on enemy targets from false fire positions. For this, 180 guns were used—24 were 152mm and 203mm—and 2,960 projectiles and mortar shells were expended.

On 3-6 January the advance of artillery into position was simulated, fire positions were laid out, and ranging fire continued. During this time, 550 gun mock-ups were brought in and installed. Night searches were conducted simultaneously in the sectors of the 336th, 148th, and 100th rifle divisions.

Artillery, tank, and combined arms reconnaissance groups were enlisted in the divisions for reconnoitering attack and fire positions and probable axes of main attacks.

On 6-10 January preparation for a breakthrough was conducted, which brought increased activity by reconnaissance and search groups. Reconnaissance established that the enemy knew of the regrouping and bringing up of infantry, artillery, and tank units and of their concentration by the Soviet command on the Warsaw-Dembitsa line. The bridgehead on the west bank of the Vistula allowed the enemy to decide that an offensive was being prepared here. At the same time, the concentration of a tank army on the left flank of the 60th Army forced the enemy to take retaliatory actions.

On this axis, the enemy increased its reconnaissance and obstacle construction, and mined roads, bridges, and populated areas. Artillery activity increased: methodical fire attacks were conducted on the forward edge of our defense and on the tank "concentrations" near Zavada, Radomysl, Velka, Pustynya, and Dombe. On 10 January the fascists transferred the 344th Artillery Regiment, which had arrived from the Western Front, to Tarnow, and, 2 days later, the 359th Infantry Division

was moved to the front line from Tarnow. In addition, our reconnaissance detected the movement of a large enemy formation from near Krakow toward Tarnow.¹⁰

During preparation for the offensive, a partial camouflage operation was conducted on the right wing of the 1st Ukrainian Front to conceal from the enemy the redeployment of two artillery divisions and two tank destroyer brigades, which, with the start of the offensive, were transferred to another axis.

The engineer troops of the 6th Army had to quickly create false artillery positions and make them appear real with periodic volleys and single shots from roving guns. The 62d Combat Engineer Brigade prepared and installed in good time 329 gun mock-ups. The rate of fire was maintained according to plan. The command's plan was carried out, and the enemy, not having detected the redeployment of the artillery formations, fired on false batteries, in 3 days expending on them 105 large caliber projectiles.¹¹

In a number of sectors the troops of the 1st Ukrainian Front prepared to conduct false infantry and tank attacks: tank and infantry mock-ups were put into action with the aid of a system of ropes, winches, and hoists. The idea was to weaken enemy fire on the main breakthrough axis, to detect the batteries that had entered the action after our false attack, and to determine the fire plan of the enemy defense.

The false attacks were organized and carried out by the 23d Combat Engineer Assault Brigade, which was commanded by Hero of the Soviet Union Colonel I. P. Koryavko. The mission was executed with great skill. When the entire plan for the false attack was put into action, the fascists opened heavy artillery, mortar, and machine gun fire on our positions.

Camouflage was also conducted successfully on the Sandomierz bridgehead, from where the troops of the 1st Ukrainian Front made the main attack.

Before planning work on preparation of the concentration areas, the staff of the front engineer troops established camouflage specifications and the camouflage capacity of the forests and of other natural screens that would permit the concealed disposition of troops and combat equipment at the bridgehead. The staff also determined the zones visible to the enemy. It was established that the enemy, occupying the commanding heights, could observe the operations of our troops on the forward edge and to a depth of 5 to 8 kilometers. To ensure the concealed movement of units and formations to the attack position for the offensive, excavation of main communications trenches and installation of vertical screens was

planned in the zones visible to the enemy. Conducting reconnaissance, the chiefs of the army engineer troops compiled a plan for excavation of the main communications trenches and installation of the vertical screens. By the start of the offensive, 73 kilometers of vertical screens had been built and 121 kilometers of main communications trenches dug at the bridgehead.¹²

The concentration of a great number of troops required special measures for the effective use of camouflage. The forests at the bridgehead did not ensure concealed disposition of personnel and equipment through their ordinary use.

Concealed disposition of the troops at the edge of forests and along public roads was achieved by making vertical screens from the vegetation. The screens extended 100 to 200 meters into the depth of the forest, blended with the forest mass, and did not attract attention.

Huts of poles and branches were built for sheltering horses; earthen cells covered with vegetation were built for vehicles and tanks. Models of similar structures were built in each forest. Cross-country roads were made through clearings for forest entry and maneuver. To maintain the forests, control chiefs with an appropriate staff of watchmen were designated. Units were given specific areas for cutting wood; outside of these areas procurement of wood was categorically forbidden.

In all, 240 kilometers of vertical screens were installed at the bridgehead, 180 kilometers of cross-country roads were cut through clearings,¹³ and careful reconnaissance and preparation of traffic routes for the troops was conducted.

Troop concentration areas were designated in the forests of the central part of the bridgehead, but they could be used only after special preparation.

The command established nine main areas. Each area (forest or group of forest sectors) received a code name. Roads were built in all areas.

The troops began to occupy the concentration areas in the last days of December. The units marched at night and arrived at their designated areas at the bridgehead before dawn. The plan was to bring in no more than one or two rifle divisions a night. Movement was conducted in battalion columns. Control and traffic service was organized on the march routes. Officers, allocated by the sector control chiefs, met the subunits at points designated in advance and directed them to their assigned areas.

The preparation of the concentration areas, the first conducted on such a large scale, made it possible to accommodate a large number of troop formations in an organized manner in small forest areas.

Combat experience showed that the conduct of operations to prepare areas for the concealed concentration of men and equipment should be carried out as quickly as possible immediately before the arrival of the units, and preferably by the troops themselves.

The political deception of the enemy conducted on 24-31 December 1944 deserves special attention: leaflets were dropped into enemy troop dispositions, transmissions were made from powerful radio installations, prisoners were taken, and so on.

Because of the operational camouflage, the enemy was disoriented about the strength and, partly, about the axis of the main attack by the 1st Ukrainian Front. Expecting the Soviet troop offensive from the bridgehead, the Hitlerites brought up their reserves there. Knowing about the concentration of tanks and equipment on the left wing of the front, they simultaneously kept a strong force (about five reinforced infantry divisions) in this sector until the beginning of the breakthrough.

The camouflage conducted by the Soviet troops during the preparation of the Vistula-Oder operation, because it was realistic and complete, disoriented the fascist German command about the composition of our grouping, about the time of the offensive, and, partly, about the axis of the main attack. Camouflage preparation of the Sandomierz bridgehead made possible the secret concentration and billeting of the troops arriving for the offensive.

The false grouping of our troops on the east bank of the Vistula and the simulation of the axis of attack toward Krakow occupied the enemy motorized and tank formations designated to counter our attack. The 4th Tank Corps, and the 21st Army concentrated somewhat north of it, played a large role in making the force appear real.

The lack of preparation and discipline of some commanders and units carrying out camouflage, the small number of qualified camouflage units, the great shortage of organic army camouflage equipment, and the absence of tank, vehicle, and gun mock-ups affected the conduct of camouflage negatively to one degree or another. The equipment mock-ups were made from raw materials, were heavy, and were so cumbersome that their maneuver was difficult and their repeated use was ruled out. There was not enough sound equipment to make the false concentration areas and the accumulations of combat equipment appear real.

However, despite these shortcomings, the Soviet troops, because of their creative approach, resourcefulness, and enthusiasm of the officers and soldiers, successfully used camouflage and, by doing this, greatly ensured the tactical and operational surprise of the offensive.¹⁴

* * *

After the advance of the Soviet troops to the Oder the enemy planned to attack the flank and rear of the 1st Belorussian Front with forces of the Vistula army group operating in East Pomerania. The complexity of the situation was aggravated because, during the offensive, the troops of the 1st Belorussian Front had suffered considerable losses and expended their reserves, the rear services had lagged behind, and the armies had had a severe shortage of ammunition and fuel.¹⁵ General Headquarters directed the troops of the 2d Belorussian Front to carry out the final destruction of the enemy's East Prussia force and to seize Gdansk and Gdyna. The right wing of the 1st Belorussian Front was weakly covered on nearly a 300-kilometer sector. To eliminate the enemy threat from East Pomerania, General Headquarters ordered the troops of the 1st and 2d Belorussian fronts to destroy the enemy grouping operating there. The troops of the right wing of the 1st Belorussian Front were enlisted to carry out this mission. The front had to regroup two tank armies, a combined arms army, two tank corps, and a cavalry corps a considerable distance along the front.

To ensure full concealment of the troops' regrouping, the command of the 1st Belorussian Front decided:

- to break contact between the troops and the enemy and to conduct marches only at night;

- to leave part of the forces of the tank armies, with radios and radio nets, in contact with the enemy for some time to convince the fascist German command that the same formations were still operating in front of them;

- to categorically forbid the use of radios (to seal up the radios) by units conducting marches;

- to order the front's aircraft not to allow enemy aircraft into the troops' regrouping area;

- to bypass populated areas and cities, for which careful organization of the security service and traffic control service was necessary; to order the security service to see that the marches were concealed, that the camouflage of equipment was carefully controlled, that the troop dispo-

sitions were guarded, and that personnel, combat equipment, and motor transport that fell behind were assembled and sent on to their formations.

The traffic control service was to ensure march discipline and troop movement along precisely designated march routes during set periods.¹⁶

Because of the good organization and precise execution of the operational camouflage plan, the regrouping of large forces and their equipment along the front was not detected by enemy reconnaissance. The command of the 1st Belorussian Front succeeded in providing operational surprise for the attack.

* * *

The East Prussia operation was conducted by the troops of the 2d and 3d Belorussian fronts, with the help of the Red Banner Baltic Fleet and units of the 1st Baltic Front, on 13-25 April 1945.

The 2d Belorussian Front (commander, Marshal of the Soviet Union K. K. Rokossovskiy; military council member, General N. Ye. Subbotin; chief of staff, General A. N. Bogolyubov) attacked in the general direction of Marienburg and Elbing. The 3d Belorussian Front (commander, General N. D. Cherenyakhovskiy; military council member, General V. Ye. Makarov; chief of staff, General A. P. Pokrovskiy) attacked north of the Mazur Lakes on the Königsberg axis.

By decision of the military council of the 3d Belorussian Front, from 1 through 10 January 1945 camouflage was conducted in the zone of the 31st Army to show preparation for an offensive toward Troiburg: the concentration of two tank regiments and one tank brigade was simulated near the natural boundary of Rakovskiy Lys, Lake Byale, and Noviny Penki; that of two tank regiments and a tank brigade near Pshebrud, Podvulchanka, and the natural boundary of Konetsbur; an artillery concentration was simulated near Filipow, Podvulchanka, and Stoki.

To execute these measures 170 tank mock-ups and 20 vehicle mock-ups were prepared.

The tank mock-ups were moved by rail in 2 echelons (40 flatcars and 10 covered cars in each). After unloading, the mock-ups were delivered to the concentration areas on vehicles.

To make the concentration areas appear real, camouflage specialists of the 7th Detached Camouflage Company set up sheds and parking areas for vehicles, built huts from local materials, built false repair shops, lit

fires, and simulated the smoke from field kitchens and the movement of vehicle columns.¹⁷

The parking areas of real tank subunits were used by the front camouflage specialists during the organization of the show of concentration areas. In addition, signs that the areas were inhabited were increased by building sheds, vehicle parking areas, and huts made of local materials and by setting up false repair shops that were dispatched to separate mock-ups on tank traffic routes between the unloading station and the concentration area. At night fires were lit in the concentration areas; during the day, the field kitchens emitted smoke. Movement of vehicle columns was simulated every night.¹⁸

All of the work on the show of false tank concentration areas and on the reinforcement of artillery positions with mock-ups was carried out by the 7th Detached Camouflage Company.

Camouflage to disorient the enemy about the commitment to battle of the 11th Guards Army of the 3d Belorussian Front was of great importance. The army's start line was 20 to 25 kilometers north of the planned one, and was up to 8 kilometers wide along the front. The army was faced with secretly and rapidly conducting a complex maneuver from the zone of the 5th Army to the zone of the 39th Army: first it was to make a forced march to the northwest to reach the indicated line, and then, after occupying the attack position, it was to attack to the southwest.

The organized movement first of all ensured speed and concealment. Maintaining radio discipline (control was carried out by communications officers), restricting conversations, eliminating correspondence, and searching suspicious areas—along with, of course, a saving snowstorm—ensured concealment of the move. The enemy did not detect the army's movement into the attack positions for the offensive. The fascist German command, as its documents attest, thought that the 11th Guards Army would turn up only in the zone of the 5th Army.¹⁹

The secret movement of the 11th Guards Army to the new line of commitment to battle allowed the army to successfully execute the echelon's mission of exploiting successes in the front operation, a mission characteristic of highly mobile mechanized or tank formations in its form of conduct.

On the whole, the deception of the enemy about the axis of the main attack was not completely successful.

During the preparation of the East Prussia operation the command of the 2d and 3d Belorussian fronts simulated the creation of an assault

grouping of troops on the fronts' interior wings, near Augustow, in a wooded area with lakes that the enemy had prepared in advance for flooding. Operational camouflage was unsuccessful. The enemy conducted reconnaissance in force and seized mock-ups of guns and tanks. The fascist German command exposed the axis of the main attack of the 3d Belorussian Front.

The experience of the East Prussia operation showed once again that operational camouflage must be conducted in strictest secrecy. The enemy must not be made suspicious that it is not genuine.

* * *

The Berlin operation, one of the largest of the Great Patriotic War, unfolded in April 1945. The plan of General Headquarters was to use the forces of the 1st and 2d Belorussian and 1st Ukrainian fronts, aided by the Order of the Red Banner Baltic Fleet, to surround the enemy's Berlin grouping and destroy it unit by unit. The following missions were assigned to the troops under the general plan.

The 1st Belorussian Front (commander, Marshal of the Soviet Union G. K. Zhukov; military council member, General K. F. Telegin; chief of staff, General M. S. Malinin), after going over to the offensive in the Schwedt and Gross-Gastroze sector, was to defeat the Berlin grouping of the fascist German troops, seize Berlin, and advance to the Elbe no later than the 12th to 15th day of the operation. The main attack was made by five combined arms and two tank armies from the Kostrzyn bridgehead.

Secondary attacks were made from the north and south by forces composed of two armies each to support the front's main attack grouping: the first from near Cedynia toward Ferbellin, and the second from the bridgeheads north and south of Frankfurt-an-der-Oder toward Brandenburg, enveloping Berlin from the south.

The 1st Ukrainian Front (commander, Marshal of the Soviet Union I. S. Konev; military council member, General K. V. Kraynyukov; chief of staff, General I. Yu. Petrov) had to defeat the enemy grouping near Kotbus and south of Berlin and, no later than the 10th to 12th day of the operation, advance to the Belitz-Wittenberg line and further along the Elbe to Dresden. The main attack was made by five combined arms and two tank armies from near Tribel toward Beltsig. If there was a change in the situation, the front was to use part of its forces to assist the troops of the 1st Belorussian Front in seizing Berlin.

The front carried out a secondary attack with the forces of two armies from Kolfurt toward Dresden to support the main assault grouping from the south and the offensive on the Dresden axis.

The 2d Belorussian Front (commander, Marshal of the Soviet Union K. K. Rokossovskiy; military council member, General N. Ye. Subbotin; chief of staff, General A. N. Bogolyubov) was to defeat the enemy's Stettin grouping and, no later than the 12th to 15th day of the operation, seize the Anklam-Wittenberg line, thus strongly supporting the offensive of the 1st Belorussian Front against an enemy counterattack from the north. The main attack was made with three combined arms armies, reinforced by two tank and one mechanized corps, from north of Schwedt toward Strelitz.

The staff of the 1st Belorussian Front worked out a plan to deceive the enemy and executed it successfully from 9 to 15 April 1945.

The operational camouflage plan called for creating in the enemy the impression that the front troops in the central sector were going over to a lengthy defense and were preparing an offensive from south of Stettin and Gubin. The Hitlerites would then have to transfer part of their forces from the Berlin axis to the indicated areas.²⁰

Simulated on the front to achieve this were:

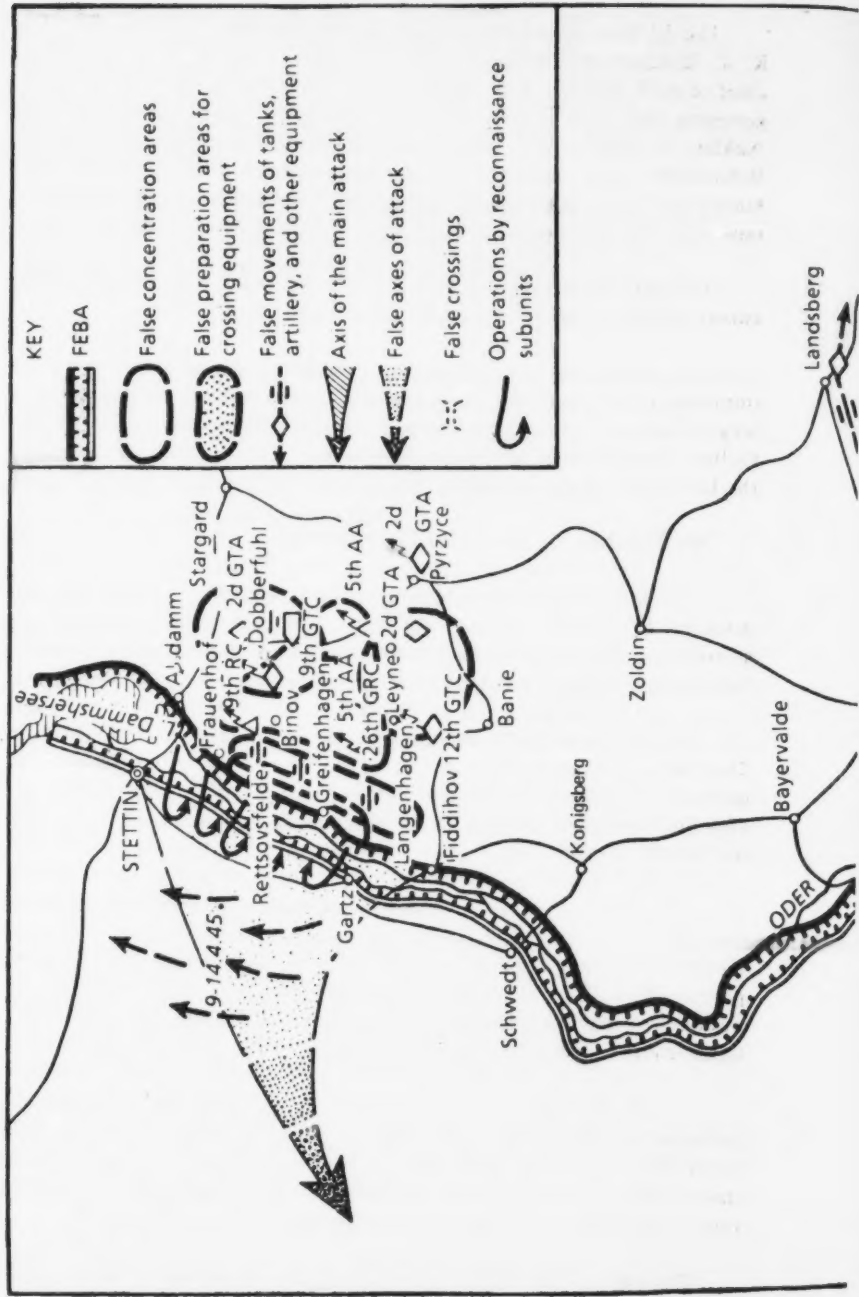
—the concentration of a tank army southwest of Grunberg. This was achieved by moving columns of tank and gun mock-ups from the unloading point at Swiebodzin to the concentration area and by building four bridges across the Oder in the Oderek-Grossen sector;

—the preparation of an offensive in the Furstenberg-Gubin sector. There were four false bridges across the Oder here, and reconnaissance was increased for 4 days, including reconnaissance in force by subunits of the 47th and 3d assault armies; air reconnaissance was increased throughout the period;

—the preparation of an offensive south of Stettin. The arrival and concentration of the 5th Assault Army southwest of Stettin and of the 2d Guards Army northwest of Pyrzyce were shown. This was achieved by placing mock-ups (110 tanks, 62 vehicles, 100 guns), concentrating camouflage equipment on the bank of the Oder, conducting engineer reconnaissance of the river, and conducting ranging fire with artillery;

—the going over to the defense in the central sector. To show this, defensive operations were increased, materials on defensive themes were published in the front, army, and division newspapers, and an order was distributed to the front troops on the removal of Marshal G. K. Zhukov and the assumption of command by General V. D. Sokolovskiy.²¹

Throughout the period, increased defensive operations were carried out along the front of the 61st, 3d Assault, 47th, 5th Assault, 8th Guards,



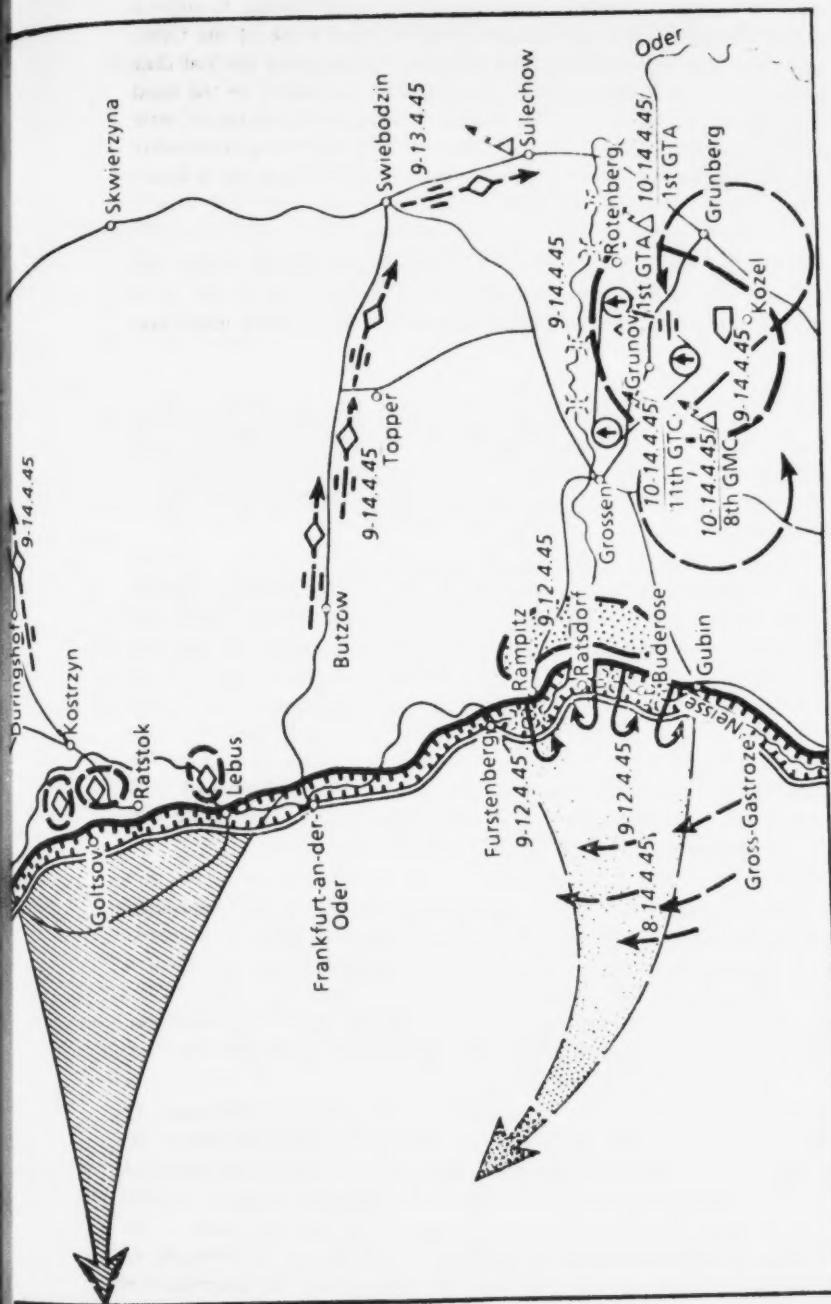


Figure 11. Plan for operational camouflage in a zone of the 1st Belorussian Front (9-14 April 1945).

69th, and 33d armies, especially in sectors visible to the enemy. To show a false concentration on the bridgehead along the west bank of the Oder, tank and gun mock-ups were set out (the enemy could easily see that they were mock-ups). Explanatory work was done with personnel on the need to strengthen the occupied lines for a long defense, and documents were slipped into the enemy position (letters from officers expressing displeasure about going over to the defense, newspapers with articles on the defense, and so on).

Camouflage was conducted by all branches of troops under the general plan approved by the front military council. Engineer units executed the most complex camouflage operations in the most important sectors.

The 15th Detached Camouflage Company camouflaged 16 echelons with tanks and self-propelled guns at the Warsaw and Minsk-Mazowiecki railroad junctions. Some echelons went to the front uncamouflaged to show the enemy that normal, planned troop replenishment with equipment was under way.

At Tsantokh station a battalion of the 25th Combat Engineer Brigade prepared 80 T-34 tank mock-ups and thirty-nine 76mm gun mock-ups. The mock-ups were camouflaged well, loaded on flatcars, and sent four times (1 echelon per day), along with escort teams, from the front line to Schneidemuhl. At Butzow, Sternberg, and Topper stations, subunits of the 17th Combat Engineer Brigade prepared 136 T-34 tank mock-ups and one hundred twenty 76mm gun mock-ups. They were sent to the Gniezno station in 8 echelons (2 per day). Thus, the withdrawal of tank formations from the front was simulated and, simultaneously, the real equipment arriving near Warsaw was kept secret.

To simulate the movement of a tank formation to the junction of the 1st Belorussian and 1st Ukrainian fronts, subunits of the 17th Combat Engineer Brigade mounted 10 tank mock-ups on vehicles and moved them from Swiebodzin to the 4 false crossings built on the Oder in the Oderek-Grossen sector. The enemy saw the movement of the tank columns. Enemy reconnaissance aircraft flew over their march routes three times.

Engineer units of the 61st Army prepared and installed 106 tank, 42 vehicle, and 22 fuel truck mock-ups near Dobberfuhl and Shvokhov; 60 mock-ups of guns of different calibers were installed near Podeyukh and Pakulent. Concentration areas for false equipment were made to appear real. The ranging fire of roving guns was directed at the west bank of the Oder. Engineer reconnaissance of the Oder increased, and the bringing up of crossing equipment to the river and the procurement of materials for

bridge construction was simulated. Camouflage was used to create the appearance of preparing for a crossing and concentrating tank units.

On the night of 11 April, a detachment of the 7th Front Defensive Construction Directorate and a battalion of the 34th Combat Engineer Brigade began building three false bridges and two docks for a ferry crossing at the bridgehead 4 kilometers west of Rampitz in the 33d Army. Lumber was transported and pilings were driven when darkness fell. Through the night, the enemy illuminated the work area with rockets and conducted artillery, mortar, and machine gun fire. However, construction continued. By 1800 hours on 12 April, 90 to 110 linear meters of bridge had been built at each point.

The Hitlerites decided that an operation was planned on this axis, and, to prevent it, on 13 April they attacked our troop positions after a powerful artillery preparation. They occupied the front-line trenches in separate sectors, but by the end of the day, the situation had been restored. Work continued on the bridges until the evening of 14 April.

On the whole, the operational camouflage achieved its goal. The enemy intensified its air reconnaissance near Grunberg, Grossen, Gubin and Stargard, and Py. zyce. Enemy aircraft bombed the false bridges across the Oder in the zone of the 33d Army and our troops' "concentration" area south of Stettin. Enemy ground reconnaissance was also activated, especially on the Furstenberg-Gubin line.²²

However, despite increased engineer work, the troops of the 5th Assault Army and 8th Guards Army, operating on the axis of the main attack, did not manage to give the enemy the impression that units here were preparing for a lengthy defense. During the conduct of measures to deceive the enemy, the troops committed a series of telltale actions: the movement of vehicles increased considerably, including over the Oder crossings; the building of observation posts intensified, without camouflage from enemy air observation, and so on.²³

Deception of the enemy was conducted successfully on the 1st Ukrainian Front. Here, smoke support of the operation was carried out on a 400-kilometer front.

The main measures of the smoke support plans, compiled by the front chemical directorate and by the army chemical departments, became part of the front and army operational timetables.

The wide use of smoke in combination with other operational and tactical camouflage was to deceive the enemy about the axis of the front's main attack and to pin down enemy forces on the left wing; assist in

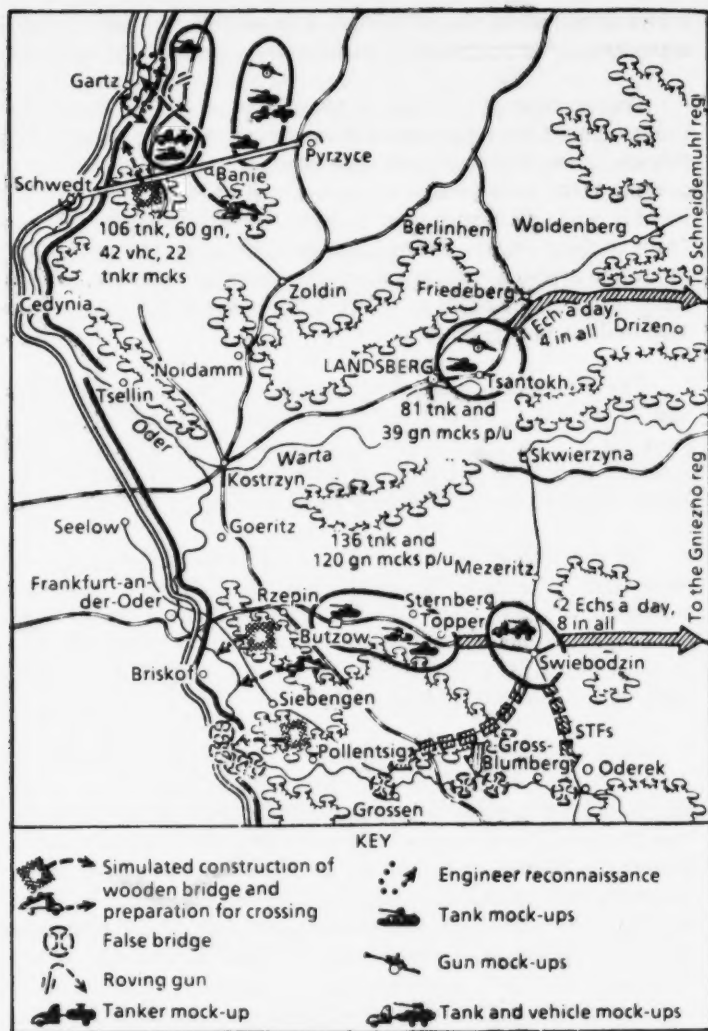


Figure 12. Operational camouflage in a zone of the 1st Belorussian Front (April 1945).

crossing the Neisse and in breaking through the enemy defense on its west bank; protect men and equipment; and ensure uninterrupted operation of rear area crossings.

Three to 5 days before the start of the operation, the following measures were conducted on the front:

—false troop-loading areas at Oppeln, Malapane, Vossovka, Gross-Strelitz, and Gross-Steinau stations were covered with smoke. The camouflage was carried out by 25 smoke generators from the 26th, 53d, 32d, 74th, and 39th chemical protection battalions. Smoke was laid at the indicated points each time enemy aircraft appeared;

—the approach of troops from the interior to the Sterlen-Leovnyutz line and toward Namslau, Olau, and Streien was feigned. Troop movement was also feigned toward Karlsrue, Brig, Grotkau; Oppeln, Steinau; Krappitz, Leovnyuta; Kozel, Leovnyutz. Chemical protection subunits from rifle divisions and regiments, using smoke pots and smoke grenades, laid smoke screens on roads. With this same purpose, the crossings near Brig, Oppeln, Krappitz, and Kozel were covered with smoke when enemy aircraft appeared;

—false troop concentration areas near Oppeln, Proskau, Folkenberg, Grotkau, Friedlyantz, Kuyau, Krappitz, and Sebar-Glogau were covered with smoke;

—camouflage was feigned for engineer operations to prepare bridge-heads for an offensive near Streipen, Strigendorf, Steifansdorf, Steinau, and Neustadt. Smoke was laid at 0500-0600 hours as though to cover the withdrawal of units that had not managed to complete their work at night.

To feign the camouflage of troop movement on the roads from the forest southwest of Oppeln toward the positions, smoke screens (each 20 to 45 minutes in duration) were laid two or three times a day on the road sections visible to the enemy.

The overall smoke front in the zones of the 21st and 59th armies was about 300 kilometers.

The control of smoke generation on the day of the breakthrough of the enemy defense (16 April) was centralized. The chief of the front chemical directorate and the front observation post near Tribel in the 13th Army's offensive zone were connected with the army commanders' observation posts, where the chiefs of the armies' chemical service were located.

Smoke screening of the landing of the forward assault detachments was conducted on this day during the crossing of the Neisse in the Gross-Gastroze-Penvikh sector. Bridges and crossings were built over the Neisse, and offensive operations in the zone of the 59th, 21st, and 52d armies were feigned.

Smoke was laid on secondary axes by chemical protection subunits of regiments and divisions, and, on the axes of the armies' main attack, by detached chemical protection battalions: by the 50th Battalion in the zone of the 3d Guards Army; by the 4th Battalion in the 13th Army; by the 64th Battalion in the 5th Guards Army; by the 8th Battalion in the 2d Polish Army; and by the 136th Battalion in the 52d Army.

Smoke was laid along nearly the entire 1st Ukrainian Front to camouflage the axes of the main attack by the armies and front.

The coordination between chemical and artillery troops was carried out in the following manner: artillery preparation was begun at 0615 on 16 April. After 35 minutes, smoke was laid along the entire front of the armies operating on the axis of the main attack. This was done to camouflage the advance of the forward battalions and assault groups to the west bank of the Neisse and to support the building of crossings and the crossing of the troops (the smoke screen lasted 65 minutes). During this time, the artillery fire did not cease, but was less intense. From 0755 (when the smoke ended) to 0840, the fire was intensified again to support the attack.

During the operation, detached chemical protection battalions, attached to the armies, covered the crossings on the Spree with smoke. In addition, to ensure the uninterrupted supply, communications, and maneuver of the troops, units of the 18th Chemical Protection Brigade and of the 68th Detached Chemical Protection Battalion covered the crossings over the Oder with smoke at Keben, Steinau, Malch, Likherfurt, Olau, Brig, and Oppeln.

The wide use of smoke on the 1st Ukrainian Front played a large role in secretly preparing the operation and in disorienting the enemy about the main attack.

Preparation for a crossing of the Oder on a secondary axis north of Stettin* was feigned on the 2d Belorussian Front. The troops of the 19th and 2d assault armies, covered by smoke, created the noise of moving equipment in this area.²⁴

* The front made the main attack with forces of the 65th, 70th, and 49th armies between Altdamm and Schwedt.

The plan to deceive the enemy from 13 to 19 April 1945, approved by the front military council, called for concealing from the enemy the real axis of the main attack, thus forcing the enemy's transfer of part of its men and equipment from the real axis of our main attack to a false axis. The fascist German command was to be made to believe that seizing Stettin was the main mission of the troops of the 2d Belorussian Front.

To achieve this, the plan was to feign the operation of three army-type radios in a new net (2d Assault Army and 49th Army) near Pribbernov, Gollnov, and Naugard; increase troop movement from the interior to near Gollnov (2d Assault Army); march units to the indicated area, without camouflage, at night and during the day; increase transport of equipment and ammunition in the Pribbernov-Gollnov sector; cover concentration areas (Pribbernov, Altdamm, Stargard) with fighter aircraft and antiaircraft artillery; concentrate two artillery breakthrough divisions near Shutzendorf, Karlshof, and Grunhorst; simulate artillery fire by roving guns and detached batteries; increase movement of detached tank subunits and concentrate them near Amalienhof, Gollnov, and Gliwice. In addition, the plan was to feign the troops' preparation to cross the water obstacle west of Gollnov through the frequent transfer of crossing equipment and the procurement of materials.

To indicate the massing of our troops, the order was given to light fires at night and to use the noise of tractors to simulate the massing of tanks and artillery in the forest north of Gollnov. Attention was paid to activating troop reconnaissance in the Gnageland-Inamyunde sector. Here the plan was to feign increased infantry movement and operations of reconnaissance groups.

The deception of the enemy conducted by the 2d Assault Army is of special interest. In this army's sector (north of Stettin), for 10 days, the enemy was to see the concentration of two armies, with a large number of tanks and artillery pieces. This feint was to distract the enemy's attention from the real axis of the attack being readied south of Stettin. All branches of troops, including special camouflage subunits, were enlisted to conduct deception. Groups of officers feigned reconnaissance for 2 days in various sectors. Troop and engineer reconnaissance was activated wherever it was planned to feign a crossing of the channel (the shores, the depth of the channel, and the approaches to the crossings were studied).

Fire positions were laid out, 500 gun mock-ups made of plywood and local materials were set up, and ammunition was "brought up" in the area where the concentration of two artillery divisions was feigned.

To simulate ranging fire and increased fire activity, each artillery regiment allocated one battery to conduct fire from false fire positions.

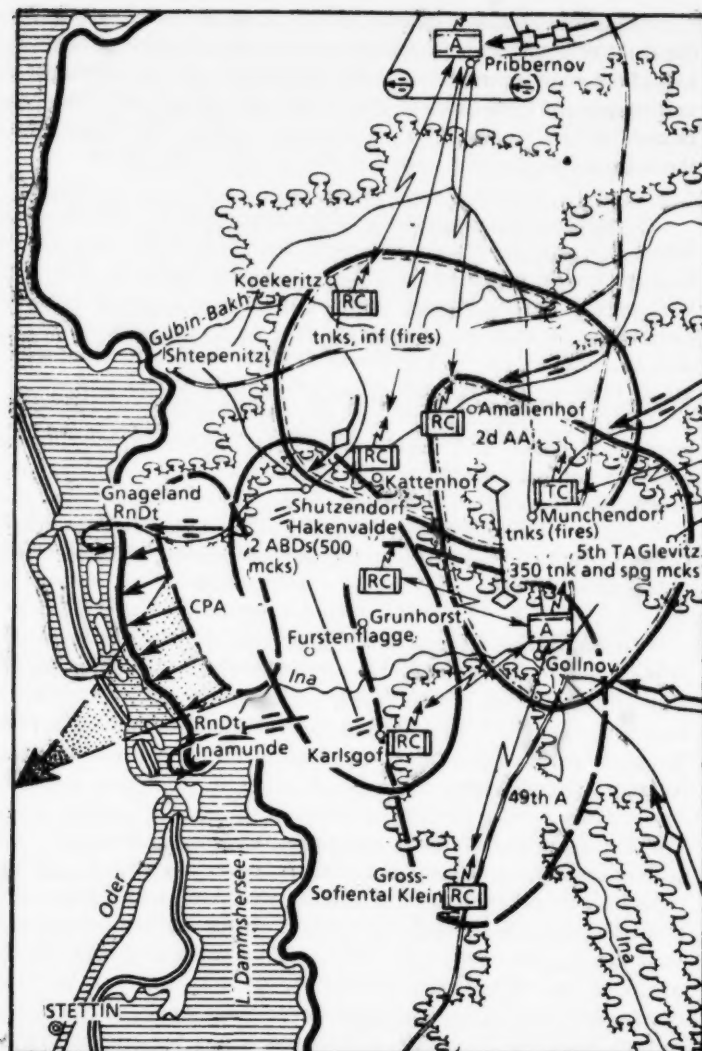


Figure 13. Plan for operational camouflage in a zone of the 2d Belorussian Front (13-19 April 1945).

When even a single enemy aircraft appeared, the antiaircraft artillery opened heavy fire, indicating air cover of the area.

Engineer subunits and teams specially allocated from tank units prepared 350 tank mock-ups, which were installed on the edges of forests in accord with the rules of dispersion and camouflage. Using a powerful loudspeaker unit, the movement and massing of tanks and artillery were simulated each night.

Division combat engineer battalions assembled and prepared boats and concentrated them in shore areas. Boards and logs were brought to the false crossings. Bridges and roads were repaired. Shelters and depots were built in false assembly areas, and tents, kitchens, and barriers were installed in populated areas and forests. At night, 250 to 300 fires were lit, for which a rifle company and 30 wagons were allocated from each regiment.

The places of operation were covered by camouflage smoke screens, which hindered the enemy's observation and made assessment of the situation difficult. Two or three times a day, the chemical protection battalion laid smoke on a 15- to 20-kilometer front for 15 to 20 minutes. Smoke pots, grenades, and ARS-6 vehicles were used to create the smoke screens.

The enemy paid attention to the camouflage of the 2d Assault Army. Three days after the camouflage began, the enemy intensified its combat in our troops' false concentration areas: reconnaissance was carried out and several fire attacks were made. The Hitlerites pulled up an armored train, which conducted several artillery volleys on the roads. During the two days before the general offensive, the enemy expended over 6,000 projectiles and mortar shells.

Enemy craft began operations around Stettin harbor. Coming in close, they fired on our shore. Enemy aircraft increased observation of the false troop concentration area and fired on it with machine guns.

The enemy increased its reconnaissance in force in the army sector. Each night, the Hitlerites sent combat outposts to deserted islands to eavesdrop and observe Soviet troop operations; the enemy used rockets to signal active operations. The enemy relieved the defending units with fresher troops and brought up as many as 40 tanks.

Thus, the operational camouflage conducted on the front, particularly in the 2d Assault Army, achieved its goal.

Large-scale operational camouflage was conducted for the Dnepr Military Flotilla. On the Berlin axis, its ships had to break through on the Oder River along strongly reinforced enemy lines from 6 to 11 kilometers long.

Under the operational camouflage plan, the breakthrough was to be carried out by surprise, in darkness, observing blackout and sound masking. Hydroplanes were ready to quickly cover the ships with smoke. The ships' radios were permitted to operate only on receive; they were not permitted to transmit until the enemy had been detected. At 0105 on 27 April a group of breakthrough vessels left Alt-Ryudnitz for the breakthrough. At 0200 an enemy artillery battery, taking the vessels' engine noise for the noise of tanks at the Noi-Buttsov crossing, opened fire on the crossing. An antiaircraft battery, apparently taking the vessels' engine noise for the noise of aircraft, opened fire into the air. Because of the breakthrough, the brigade vessels suppressed and destroyed 13 enemy machine gun emplacements and 2 mortar batteries. After this, the vessels began transferring the 234th Rifle Division across the Oder near the city of Schwedt.²⁵

Operational camouflage contributed to the defeat of the enemy in the Berlin operation. Berlin fell. Fascist Germany surrendered unconditionally.

* * *

In August 1945 the Soviet Armed Forces conducted the Manchurian operation in the Far East—the last major operation of the Second World War. Because of this operation, the main assault grouping of the Japanese ground forces, the Kwangtung Army, was defeated, and imperialist Japan surrendered unconditionally.

The plan of this operation was to surround, break up, and destroy the Kwangtung Army with the forces of the Transbaykal and 1st and 2d Far Eastern fronts in coordination with the Pacific Fleet and the Amur Military Flotilla.

The Transbaykal Front (commander, Marshal of the Soviet Union R. Ya. Malinovskiy; military council member, General A. N. Tevchenkov; chief of staff, General M. V. Zakharov) operated from the territory of the Mongolian People's Republic and made the main attack with the 17th, 39th, 53d, and 6th Guards tank armies toward Changchung. In addition, the front launched two secondary attacks: with a mounted and mechanized group toward Dolonor and Kalgan, and with the 36th Army toward Hailar and Chalandun.

The 1st Far Eastern Front (commander, Marshal of the Soviet Union K. A. Meretskov; military council member, General T. F. Shtykov; chief of

staff, General A. N. Krutikov) advanced from Primorye and made the main attack on Mutankiang with the Order of the Red Banner 1st and 5th armies. Secondary attacks were made on Mishan with the forces of the 35th Army and on Antu with formations of the 25th Army.

The 2d Far Eastern Front (commander, General M. A. Purkayev; military council member, General D. S. Leonov; chief of staff, General F. I. Shevchenko) operated from Priamurye and attacked Harbin and Tsitsihar.

The Pacific Fleet (commander, Admiral I. S. Yumashev; military council member, General S. Ye. Zakharov; chief of staff, Admiral A. S. Frolov) covered our ports and sea lines of communication and assisted the ground forces in seizing ports and naval bases in North Korea, on Sakhalin, and in the Kurile Islands.

A High Command of Soviet troops in the Far East, headed by Marshal A. M. Vasilevskiy, was created for direct control of the operations.

Our troops achieved surprise in the Manchurian operation because operational camouflage was conducted successfully. "Our striving for surprise in our operations," wrote General of the Army S. M. Shtemenko, "was greatly complicated because the Japanese had long and steadfastly believed in the inevitability of war with the Soviet Union. Achieving strategic surprise was hardly possible. Nevertheless, after pondering this problem we returned more than once to the first days of the Great Patriotic War: our country had also expected the war and prepared for it; however, the German attack was a surprise. Consequently, surprise did not have to be prematurely repudiated in the given situation."²⁶

The surprise of the start of the war with imperialist Japan depended most on keeping secret the plan of the operation and the Soviet Forces' degree of preparation for the offensive.

By a General Headquarters directive the commander, military council member, chief of staff, and chief of operational administration of the front staff were admitted fully to the development of the operation plan. The chiefs of the branches of troops and of the support services were admitted to the development of special sections of the plan, but were not familiar with the overall missions of the front. "Army commanders," said the directive, "will be assigned missions personally and orally, without the delivery of written directives from the front. The order of admittance to the development of an army operation plan will be established the same as for the front. All documentation on the plans of troop operations will be kept in the personal safes of the front and army commanders."²⁷

A special schedule for regrouping was developed and strictly observed to keep secret the Soviet troops' level of combat readiness for the offensive. The date of the start of combat operations was revealed to no one. The General Staff assumed that the Japanese command, taking into account the relatively low capacity of the main rail line and the unfavorable weather in Manchuria in August, would figure the start of the war sometime in the fall. It was later confirmed that the General Staff was not wrong in its assumptions. The Japanese command actually expected the start of the war in mid-September or at the beginning of October 1945. As the captured deputy chief of staff of the Kwangtung Army, General M. Tomokatsu, revealed, the army staff had known that after March 1945 the number of Soviet troops on the Manchurian border was increasing constantly. However, the specific dates of the USSR's entry into the war remained unknown. The declaration of war by the Soviet Union on 8 August was completely unexpected by the Kwangtung command.²⁸

The concentration, regrouping, and deployment of the troops in the attack position were carried out with careful observance of camouflage.

The concentration areas of the arriving units and formations were designated on a wide front and at a distance that ensured not only rapid but also simultaneous movement into the waiting and attack positions. All troop movements were carried out at the same time that exercises were organized, which made it possible for the formations to achieve both concealment and cohesiveness.²⁹

Border troops served in their sectors as usual. In fortified areas, specially allocated teams harvested hay, simulating normal garrison life in fortified areas for this time of year to ensure concealment of preparation for the operation.³⁰

The populace was not moved from the front zone, and its peaceful life was in no way disturbed. All troop movements during regrouping, concentration, and deployment were conducted only at night. At rests and stopovers, the troops took position in forests and hollows, carefully camouflaging the equipment. In the steppe areas of Dauriya and the Mongolian People's Republic, tanks, guns, and vehicles were sheltered in specially dug trenches. The equipment was covered from above with camouflage covers and nets. Thus, over 2,000 tank and gun covers, about 400,000 square meters of nets, and 64,000 individual riflemen nets were used for this on the Transbaykal Front.³¹

The troops were moved to the attack position at the line of the national border 1 or 2 days before the start of the operation. Movement in the attack positions, preparation of food, and cutting of wood was forbidden.

Radios operated only in units that had been at the border earlier; in newly arrived units, they were switched on only to receive radiograms.

On all fronts, false rail and motor transport of troops was conducted and false concentration areas were set up. Vertical camouflage fences and overhead screens were installed along roads visible to the enemy. In the zone of the 5th Army alone, 18 kilometers of vertical camouflage fence and 1,515 overhead screens were installed on the axis of the main attack.³² Officers dressed in soldiers' uniforms during reconnaissance.

The conduct of battle by the forward battalions to secretly cross the national border and seize the Japanese border defensive zone deserves attention. It began at night without artillery preparation.

To deceive the Japanese command and disorient it about the axes of the main attacks, engineer work to equip attack positions was conducted throughout the front. The work was conducted primarily at night on the main axes.

To keep secret the arrival in the Far East of Marshals of the Soviet Union A. M. Vasilevskiy, R. Ya. Malinovskiy, and K. A. Meretskov, and of other generals, a decision was made to temporarily change their last names and replace their insignia of military rank (shoulder straps, tabs, and so on).*

The Soviet Command gave special attention to keeping secret the arrival of new troop contingents in the Far East. The greatest difficulties in solving this problem fell to the 5th Army of the 1st Far Eastern Front. As is well known, for over 400 kilometers from Khabarovsk the railroad runs next to the national border; in some sectors, it is in the enemy's field of vision. In addition, the 5th Army was to be concentrated in a small area near the national border. To make sure that the concentration in the attack position was concealed, the billeting of troops in populated areas was forbidden and the unloading of echelons and movement to the border were carried out only at night. A false troop concentration area was prepared on one of the secondary axes of the 1st Far Eastern Front.

As an example, we will make a more detailed examination of the operational camouflage of the troops in the Primorye group (later the 1st Far Eastern Front), in the 25th Army, and in the Primorye Air Defense Army.

In accord with the camouflage instructions approved by the front military council in May 1945, the camouflage plan was to give the enemy

* A. M. Vasilevskiy became Colonel General Vasilev; R. Ya. Malinovskiy, Colonel General Morozov; and K. A. Meretskov, Colonel General Maksimov (see *The Finale*, p. 132).

the idea that our troops were regrouping to the left flank to go over to the offensive on the main axis of Hongchun and Yangtze and on the secondary axis of Iman and Paotsing. The enemy was to be deceived by imaginary rail and road transports, a show of false troop concentration areas, the laying out of attack positions for the offensive, and the activation of reconnaissance in the Ovchinnikovo-Novaya Derevnya and Ebergard-Lazo sectors. There was to be a simultaneous show of preparatory work for going over to an active defense in the remaining sectors of the front zone.³³

In accord with this plan, the troops were assigned the following missions: the 25th Army was to conduct engineer operations to set up a bridgehead for the offensive in the Tizinke-Novaya Derevnya and Mramornaya Mountain-Teplyy Khrebet Mountain sectors; conduct commander's reconnaissance in these sectors and engineer operations to reinforce the defense in the rest of the zone; set up unloading stations at Zaysanovka and Kraskino; and reconnoiter and set up troop unloading areas. The Order of the Red Banner 1st Army was to conduct engineer operations in its zone to reinforce the defense and was to increase reconnaissance by observation. The 35th Army was to conduct engineer operations to set up a bridgehead for the offensive in the Ebergard-Lazo sector and was to conduct commander's reconnaissance on this same axis and engineer operations to reinforce the defense in the remaining sectors.

The army troops did not know that their operations were false. All operational camouflage was carried out under the guidance of the staff department of the Primorye group according to plan (appendix 7).³⁴

Camouflage was conducted for 25 days and was executed successfully in all of the armies.

In the 25th Army of the 1st Far Eastern Front all troop movements near the border and in the interior were conducted at night, using natural features, vegetation, and so on. All movement was forbidden during the day. Sound masking and blackout were strictly observed during troop movements. Vehicle movement was permitted only with blackout lights. Populated areas were bypassed. Stopping near them was prohibited (individual soldiers and commanders were permitted to stop).

To maintain the secrecy of the night operations of forward battalions, the artillery of the 25th Army was to open fire only if the enemy put up resistance. Therefore, artillery preparation was not planned in advance, but determined during the battle, when the main Japanese forces were encountered.

The troops of the Primorye Air Defense Army conducted camouflage to conceal the troops' combat formations from enemy ground and air

reconnaissance, to deceive the Japanese with false combat formations, and to camouflage defensive objectives with smoke screens and blackouts.

All main command posts were built underground. In areas with high levels of underground water, above-ground command posts were camouflaged to imitate surrounding structures. Telltale structures such as depots, latrines, washstands, and so forth were moved 300 to 500 meters from the command posts, or buried in the ground and carefully camouflaged. Radios were set up in trenches at the same distance; wires leading to the command posts were buried in the ground or in embankments.

All main and reserve fire positions were carefully camouflaged with organic and local resources. Positions were cleared of extraneous telltale objects and structures. In the zone 6 to 8 kilometers from the border, sections of access roads visible to the enemy were covered with vertical screens. In this zone transport moved only at night.

For each five-battery antiaircraft artillery battalion, at least two false field positions were set up; there was at least one for a three-battery battalion.

At least two false hearths were set up 3 kilometers from each defended point. They were provided with the needed amount of combustible materials, with communications, and with a duty group (two to three men) for putting the hearths into operation.

Smoke screening of the railroad bridges on the Iman, Vaka, Ussuri, Lefa, and Suifun rivers was carefully organized, using technical resources and local materials.

Blackout equipment was carefully prepared in all housing and service areas; the equipment was put into use when a threatening situation developed.

A flyover of the entire troop disposition was conducted periodically to reveal camouflage defects.³⁵

The operation showed that the operational camouflage conducted on all fronts had a positive effect. The strength and axis of the main attacks of our troops were usually a surprise for the Japanese command. "We did not expect," said the commander of the 5th Japanese Army, General Semizu, "that the Russian Army would cross the taiga, and so the offensive by the impressive Russian forces from almost inaccessible areas was a complete surprise for us."³⁶

* * *

The operational camouflage conducted in the troops in 1945 was distinguished by its realism, great scope, and diversity of methods and forms, and also by the participation of the staffs of the branches of troops and of political organs at all levels in putting the camouflage into practice.

There were the following developments in deceiving the enemy: the conduct of reconnaissance in force on the day of a general offensive for several hours before the start of artillery preparation (the Vistula-Oder operation);* the conduct of platoon operations to feign attacks (the 1st Ukrainian Front in the Vistula-Oder operation); the laying of smoke on a wide front (in the Berlin operation: 80 kilometers by the 2d Belorussian Front, 100 kilometers by the 1st Belorussian Front, and 400 kilometers by the 1st Ukrainian Front); the conduct, for 2 days before a general offensive, of reconnaissance in force, and the carrying out of night artillery preparation and support of an infantry and tank attack with illumination by 140 searchlights (the 1st Belorussian Front in the Berlin operation); the conduct of political deception of the enemy (the 1st Ukrainian Front in the Vistula-Oder operation).

The Soviet troops in the Far East acquired rich experience in conducting operational camouflage in desert and mountain-taiga theaters of operations.

Notes

1. Mellenthin, p. 280.
2. *Ministry of Defense Archives*, f. 16-A, op. 949, d. 7, I. 12.
3. *Ministry of Defense Archives*, f. 16-A, op. 949, d. 7, I. 12.
4. *Ministry of Defense Archives*, f. 16-A, op. 949, d. 7, I. 17.
5. *Ministry of Defense Archives*, f. 236, op. 210750, d. 1, I. 2.
6. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, II. 21-22.
7. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 23.
8. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 24.
9. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 26.
10. *Journal of Military History*, 1966, No. 5, p. 47.
11. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 30.
12. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 14.
13. *Ministry of Defense Archives*, f. 236, op. 2673, d. 2004, I. 16.
14. *Journal of Military History*, 1966, No. 5, p. 48.
15. *50 let Vooruzhennykh Sil SSSR [Fifty Years of the Armed Forces of the USSR]* (Moscow, 1968), p. 431.
16. *Ministry of Defense Archives*, f. 16-A, op. 949, d. 7, I. 24.
17. *Ministry of Defense Archives*, f. 69, op. 263341, d. 2, I. 9.
18. *Ministry of Defense Archives*, f. 69, op. 263341, d. 2, I. 9.
19. K. N. Galitskiy, *V boyakh za Vostochnuyu Prussiyu [The Battles for East Prussia]* (Moscow, 1970), p. 235.

* In 1944, reconnaissance in force was conducted 1 day before the start of a general offensive.

20. *Ministry of Defense Archives*, f. 233, op. 2356, d. 498, II. 1-4.
21. *Ministry of Defense Archives*, f. 233, op. 2356, d. 498, II. 1-4.
22. *Ministry of Defense Archives*, f. 233, op. 2356, d. 498, I. 2.
23. *Ministry of Defense Archives*, f. 233, op. 20902, d. 4, II. 30-31.
24. Rokossovskiy, p. 358.
25. OTsVMA, f. 211, d. 16499, II. 21, 25.
26. Shtemenko, p. 347.
27. Cited in Shtemenko, pp. 354-355.
28. Cited in Shtemenko, pp. 354-355.
29. L. N. Vnotchenko, *Pobeda na Dalnem Vostoke* [Victory in the Far East] (Moscow, 1971), p. 83. [Hereafter cited as Vnotchenko—U.S. Ed.]
30. *Final* [The Finale], 2d ed. (Moscow, 1969), p. 131.
31. *Inzhenernyye voyska Sovetskoy Armii v vazhneyshikh operatsiyakh Velikoy Otechestvennoy voyny* [Soviet Army Engineer Troops in Important Operations in the Great Patriotic War] (Moscow, 1958), p. 296.
32. Vnotchenko, p. 136.
33. *Ministry of Defense Archives*, f. 234, op. 3213, d. 229, I. 11.
34. *Ministry of Defense Archives*, f. 234, op. 3213, d. 229, II. 12, 13.
35. *Ministry of Defense Archives*, f. 234, op. 3213, d. 229, II. 8-10.
36. *Ministry of Defense Archives*, f. 294, op. 36402, d. 3, I. 87.

Conclusion

The experience of the Great Patriotic War showed that the troops' skillful conduct of operational camouflage—the most important way to achieve surprise—contributed to the successful execution of combat missions in defensive and offensive operations, reduced losses in personnel and combat equipment, and forced the enemy to make erroneous decisions that led to defeat.

The effectiveness of operational camouflage depends on efficient organization and planning, secrecy, realism, timeliness, and diversity of the measures conducted, on strict observance of troop camouflage, and on constant control on the ground and from the air.

Disorienting the enemy about our troops' future operations (intent, scale, time of conducting an operation) has been achieved by simulating the axis of the main attack and the concentration of an assault grouping; by creating a false massing of men and equipment on secondary axes; by conducting individual operations with small forces to support the operations of the main forces; by showing false movements of groupings advancing to the enemy flanks and rear units; by creating, on the inner and outer front, a false encirclement of the enemy to demoralize its forces; by feigning movement of columns and groupings to increase the scope of the pursuit and to convince the enemy that its main forces have been outflanked; by concealing true objectives and setting up false ones; by widely using different types of artificial camouflage, terrain conditions, and darkness; by enforcing security; and by concealing command and control of troops and other resources.

The methods of carrying out operational camouflage depend on the assigned mission, men and equipment, time, and weather. The operations of units and subunits enlisted for operational camouflage must be convincing to the enemy and, at the same time, must in no way reveal the preparation for the actual operation.

The centralized leadership of the Supreme High Command General Headquarters and of the General Staff played an important role in organizing operational camouflage throughout the war. General Headquarters defined the intent of the camouflage effort. The front commander made the decision for operational camouflage, and its plan was developed by the chief of staff and approved by the military council. In the armies,

operational camouflage was conducted under the instructions of the front commander.

The front commander's decision on the conduct of operational camouflage usually included the intent of the camouflage effort, the number of men and quantity of equipment for the entire operation, the dates of preparation and order of conduct of the operational camouflage plan, and the order of control over the execution of the camouflage. The front commander's decision was revealed to a limited group of people.

Combat experience has shown that success in conducting operational camouflage depends greatly on initiative and creativity in commanders and on purposefulness in the execution of missions. Operational camouflage must be given the most careful attention not only by the Supreme Command, but also by front and army commanders and their staffs. Front and army commanders, deciding on the conduct of operational camouflage, must proceed not only from their own troops' plan of operations, but also from those of adjacent units. All branches of troops and services of the armed forces must be enlisted to secretly prepare an operation and to disorient the enemy about the main attack of our troops.

Political organs and party organizations have played a large role in the successful conduct of operational camouflage. They have mobilized Communists and all personnel for the careful execution of camouflage.

The experience of carrying out operational camouflage in the operations of the past war is of genuine importance in the combat training of troops today.

Appendix 1. Plan for Using Smoke to Camouflage and Cover the Units of the 24th Army in an Offensive Operation.

Purpose and boundaries of smoke production	Logistic support	Executed by whose order	Who executed	Time of smoke production	Notes on execution
To blind enemy observation posts and fire positions near Trekhostrovskaya and Nizhniy Akatov and to cover concentration and movement of units of the 120th Rifle Division along the Don River on lines:					
Panshinka River and 600 meters north (screen no. 1)	500 smoke pots	Commander of 120th Rifle Division	Chemical subunits	10 minutes	Not executed
Lake Kalach, Lake Krivoye (screen no. 2)	700 smoke pots	Commander of 120th Rifle Division	Chemical subunits	10 minutes	Executed
Smoke production by aircraft on eastern shore of Don (screen no. 3)	Aircraft	Army commander	Front aviation	By order of the army commander	Not executed
Launch of rafts with smoke pots on Don	Rafts and smoke pots	Commander of 120th Rifle Division	Chemical subunits	30 minutes	Partly executed
Firing of artillery smoke shells on Trekhostrovskaya	500 smoke shells	Commander of army artillery	Artillery regiments of the 120th and 84th rifle divisions	By order of commander of army artillery	Executed
To cover advance of tanks and infantry on lines: Checkpoint 44.2 and south 2 kilometers (screen no. 4)	600 smoke pots	Commander of 120th Rifle Division	Rifle subunit	10 minutes	Executed
In zone of advance of 214th Rifle Division (screen no. 5)	500 smoke pots	Commander of 214th Rifle Division	Chemical subunits	10 minutes	Executed
In zone of advance of 49th Rifle Division (screen no. 6)	450 smoke pots	Commander of 49th Rifle Division	Chemical subunits	10 minutes	Executed
Firing of artillery smoke shells to blind enemy observation posts and fire positions near Nizhne-Gnilovskiy and Kislov	400 smoke shells	Commander of army artillery	Artillery regiments of the 214th and 49th rifle divisions	By order of commander of army artillery	Executed

Appendix 2. Camouflage Plan of the Staff of the Don Front's Engineer Troops to Deceive the Enemy in the Zone of the 24th Army (30 December 1942-9 January 1943).

Missions	Men and equipment	Commanders	Date of execution	Special instructions
Conduct reconnaissance of false concentration area	Vehicle from the 120th Engineer and Mine Battalion	Chief of 3d staff department of engineer troops, representative of 24th Army staff	30 December 1942— 1 January 1943	Chief of 3d staff department of engineer troops in charge of all measures
Simulate concentration and occupation of attack position by tank corps	150 tank mock-ups, 30 dummies, 2 platoons from the 25th Detached Camouflage Company, 1 company from the 104th Engineer and Mine Battalion, 8 vehicles from the 120th Engineer and Mine Battalion, 2 tractors from the 32d Detached Deep-Drilling Company	Commander of 25th Detached Camouflage Company	30 December 1942— 6 January 1943	Concentrate 20 mock-ups per day from 31 December 1942 through 4 January 1943; concentrate 50 mock-ups on 8 January 1943; make tank tracks with tractors
Simulate concentration of artillery and mortars	Fifty 150mm guns, seventy 76mm, fifty 45mm; 50 mortars, 150 dummies, 1 platoon from the 25th Detached Camouflage Company, 1 company from the 104th Engineer and Mine Battalion, 5 vehicles from the 25th Detached Camouflage Company	Commander of 104th Engineer and Mine Battalion	31 December 1942— 6 January 1943	Concentrate mortars and 45mm cannons by 1 January 1943; thirty 76mm and twenty 150mm cannons by 3 January 1943; other weapons by 5 January 1943

Measures to make camouflage appeal real: operate radios	2 RB radios from the 104th Engineer and Mine Battalion	Chief of communications of 104th Engineer and Mine Battalion	2-3 January 1943	By special schedule
Simulate ranging fire	2,000 simulated rounds; field firing by roving batteries designated by commander of 24th Army	Deputy commander of 104th Engineer and Mine Battalion	4-6 January 1943	By special schedule
Simulate supply	Vehicles carrying mock-ups	Chief of motor column of 120th Engineer and Mine Battalion	1-6 January 1943	By special plan
Simulate engineer work on false area	1 company from the 104th Engineer and Mine Battalion	Company commander	Entire period	By plan of engineer operations
Report results of camouflage work		Chief of 3d staff department of engineer troops, chief of troops of 24th Army		

Appendix 3. Camouflage Plan to Simulate the Crossing of the Dnepr in the Zone of Operations of the Voronezh Front (14-21 October 1943).

Measures	Location	Time	Men and equipment	Commanders	Notes
Operate radios on transmit for special deception program	Borispol, Gnedyn, Sofiyevka	16-21 October	2 RAF radios, 2 RSB radios	Chief of front communications directorate	
Simulate regrouping of rifle units	Borispol, Vishenki, Protsev	20-21 October	1 rifle regiment	Commander of regiment, officer from operational department of front staff	Subunits move west by day and back by night
Simulate regrouping of tank units	Borispol, Vishenki, Protsev	17-20 October	2 platoons from the 22d Detached Camouflage Company, 1 company from the 740th Chemical Protection Battalion, 4 T-34 tanks, 3 T-70 tanks, 1 battery of 76mm guns, 1 battery of 152mm guns, 10 collapsible tank mock-ups, 150 tank mock-ups of local material, 100 artillery mock-ups, 5 mock-ups of rocket launchers, 3 tractors, 3 vehicles	Chief of front engineer troops, commander of front armored troops, commander of front artillery, chief of front rear services, chief of front chemical directorate	When enemy aircraft appear, tanks move west. After each appearance of enemy aircraft, mock-ups are shifted. In false concentration areas mock-ups are installed at night

Prepare false concentration areas	Vishenki, Protsev	18-21 October	Same	Same	Same
Prepare false artillery positions	Gnedyn, Protsev	18-21 October	Same	Same	Same
Simulate engineer work to prepare to cross the Dnepr	Ur. Khreshchate, hill 89.5	18-21 October		Chief of front engineer troops	
Simulate Dnepr crossing by laying crossings	Ur. Khreshchate, hill 89.5	18-21 October	1 pontoon company, 1 platoon from the 22d Detached Camouflage Company, chemical protection subunits	Same	
Cover concentration area with antiaircraft fire	Vishenki, Protsev	15-21 October	Antiaircraft battery	Commander of front artillery	

Appendix 4. Smoke Production Plan to Support the Crossing of the Sozh and Dnepr Rivers by the 65th Army.

Which corps zone	Purpose and location of smoke production	Outlay of smoke equipment	Readiness	Commanders
19th Rifle Corps	Cover bridge across Sozh at Novyye Tereshkovichi from enemy aircraft	1,000 smoke pots	In operation	Chief of chemical service of 19th Rifle Corps
246th Rifle Division	Cover bridge across Sozh 1 kilometer southwest of hill 118.4 from enemy aircraft	500 smoke pots	In operation	Chief of chemical service of 246th Rifle Division
27th Rifle Corps	Cover construction of bridge across Dnepr near Loyev	500 smoke hand grenades, 2 tons smoke compound	With start of bridge construction	Chief of chemical service of 27th Rifle Corps
	Cover crossing of units over Dnepr near Kamenka, false smoke production at discretion of corps commander	500 smoke pots, 500 smoke hand grenades	By 0500 on 13 October	Chief of chemical service of 27th Rifle Corps
	Cover crossing of units over Dnepr 2 kilometers southwest of Kamenka; false smoke production at discretion of corps commander	700 smoke pots, 2 tons smoke compound	By 0500 on 13 October	Chief of chemical service of 27th Rifle Corps
	Cover crossing of units over Dnepr near hill 107.5; false smoke production at discretion of corps commander	500 smoke pots, 1 ton smoke compound	By 0500 on 13 October	Chief of chemical service of 27th Rifle Corps

18th Rifle Corps	Cover crossing of units over Dnepr 2.5 kilometers northeast of Shittsa; false smoke production at discretion of corps commander	500 smoke pots, 250 smoke hand grenades, 2.5 tons smoke compound	By 0500 on 13 October	Chief of chemical service of 18th Rifle Corps
	Cover crossing of units over Dnepr 1 kilometer south of Shittsa; false smoke production at discretion of corps commander	600 smoke pots, 250 smoke hand grenades, 1.5 tons smoke compound	By 0500 on 13 October	Chief of chemical service of 18th Rifle Corps
	Cover crossing of units over Dnepr 1 kilometer north of Raduli; false smoke production at discretion of corps commander	400 smoke pots, 500 smoke hand grenades, 1 ton smoke compound	By 0500 on 13 October	Chief of chemical service of 18th Rifle Corps

Appendix 5. Plan of Operational Camouflage in the Zone of Operations of the 1st Guards Army in the Lvov-Sandomierz Operation (4-20 July 1944).

Date	Simulation in unloading areas: Vynanka station, Vorvulinty station	Date	Simulation in concentration areas: forest east of Byaly Potok; forest southeast of Yeghinisa; forest east of Slobudka Kosylovetka, Repushinty, Kolyani, Korolyovka, Rashkov	Date	Simulation in attack positions on lines: Slobudka Dzhurynska, Polovtse; Voronov Gavrilak
4-10 July	1. Unload arriving echelons with tank mock-ups in army rear; transfer mock-ups to simulated unloading areas to feign disposition of tank units (subunits of 22d Detached Camouflage Company, infantry platoon) 2. Use powerful loudspeakers to simulate sound of tanks unloading 3. Cover unloading areas with smoke 4. Cover unloading areas with antiaircraft artillery (2 batteries from the 47th Rifle Corps)	7-10 July	1. Assemble and install mock-ups of tanks, fuel trucks, vehicles; set up fuel and lubricant bases (2 in each area) 2. Lay out march routes from unloading station to concentration areas (5 groups of 5 tankers and 15 combat engineers each) 3. Simulate movement of tanks into concentration area; show "lagging" tanks on march route 4. Use powerful loudspeakers to simulate sound of tanks moving	19 July	1. Reconnoiter forward edge in division zones of 30th Rifle Corps and 18th Guards Rifle Corps (1 group from a division) 2. Reconnoiter attack positions (3 groups of 7 to 8 men each) 3. Build march routes from concentration area to attack positions 4. Show "lagging" tank mock-ups on march routes

	5. Make unloading areas appear real: a) shift mock-ups daily to simulate arrival and departure of tanks; b) conduct intense fire with tracer bullets from small arms when enemy aircraft appear; c) move tanks and tractors daily (1 platoon of T-34 tanks and 2 tractors from rear staff of 1st Guards Army)	From 0800 to 1900, 12-15 July	5. Conduct commander's reconnaissance of populated areas		5. Install tank mock-ups in attack positions
			6. Simulate repair of equipment		6. Prepare smoke on 6- to 7-kilometer front
		From 0600 to 2000, 15 July	7. Feign increased vehicle movement on main routes in daytime	17-19 July	7. Feign increased transport of ammunition to infantry combat formations and to artillery fire positions
			8. Feign concentration of artillery and its advance into positions in the sector of the 30th Rifle Corps	From 0800 to 1900, 18-19 July	8. Conduct ranging fire according to plans of artillery corps commanders

Date	Simulation in unloading areas: Vynanka station, Vorvulintsy station	Date	Simulation in concentration areas: forest east of Byaly Potok; forest southeast of Yagelnitsa; forest east of Slobudka Koshylovetska, Repushintsy, Kolyanski, Korolyuvka, Rashkov	Date	Simulation in attack positions on lines: Slobudka Dzhurynska, Polovtse; Voronov Gavril'yak
			9. Conduct daily at least two searches for taking prisoners in the zone of each division (according to orders on reconnaissance from corps reconnaissance departments)		
		13-20 July	10. Conduct reconnaissance in force near Stadnitsy, Trybukhovtse, Khatymnyv, Gubin, Luki, Bogordychin, Inteli		
		10-14 July	11. Road operations: a) build network of light graded roads: Chertkov, Thuszcz; Byaly Potok, Rydoduby, Slobudka Dzhurynska; Yagelnitsa, Polovtse; Marylyuvka, Slobudka Koshylovetska; Koshilovtse; b) prepare light bridges and paving for creeks and rivers that will be crossed by graded roads; c) equip roads with markers and road signs		

Men and equipment:	
Engineer battalion from the 6th Combat Engineer Brigade	
Two combat engineer battalions from the 47th Rifle Corps	
Road construction battalion from the army road department	
Two platoons from the 22d Detached Camouflage Company of the front staff	
Two chemical protection companies from the 47th Rifle Corps	
Five rifle battalions from the 47th Rifle Corps	
Two antiaircraft batteries from the 25th Antiaircraft Artillery Division	
RB radios	3
Vehicles	40
Tractors	6
Fuel and lubricants	as per request
Smoke pots	20,000
T-34 tanks	6
Rifle cartridges (tracer)	40,000
Loudspeakers	2

Appendix 6. Plan to Deceive the Enemy in the Zone of the 1st Baltic Front During the Regrouping and Preparation for the Memel Offensive Operation (24 September—3 October 1944).

Measures	Men and equipment	Commanders	Overall commander
I. Measures in the zones of the 4th Assault and 51st armies			
1. Simulate reinforcement of front troops:			
a) conduct daily movement of troops of 2d Baltic Front to forward positions of 4th Assault and 51st armies	Troops of 2d Baltic Front	Commander of 22d and 3d assault armies	Front chief of staff
b) light fires in woods southwest of Baldone and northeast of Dobeles	Troops of 4th Assault and 51st armies	Corps commanders	Commanders of 4th Assault and 51st armies
c) launch balloon daily at set time south of Bauska	Balloon	Artillery commander of 4th Assault Army	Commander of front artillery
d) prepare fire positions in zones of 4th Assault and 51st armies	1 battery each from the 102d and 103d howitzer artillery brigades, and 3 M-31 rocket launchers each	Artillery commanders of 4th Assault and 51st armies	Commander of front artillery
e) organize radio operations in the real dispositions of 3d Guards Mech Corps and of 1st and 19th tank corps of the 5th Guards Tank Army	Corps radios by instruction of front communications chief	Army communications chiefs	Front communications chief

2. Feign preparation of troops for the offensive: a) conduct reconnaissance in Baldone, Yelgava, Bersmuizha, Gardene station b) increase reconnaissance in indicated areas c) increase ranging fire d) conduct false removal of mines on forward edge and make passages in minefields e) place gun mock-ups in fire positions and organize fire of roving guns from these positions f) position tank mock-ups g) simulate movement of tank units—3 mock-ups for one real tank or tractor—into the concentration area southwest of Baldone and northeast of Dobele h) feign pontoon concentration southwest of Baldone and Mitava	Reconnaissance groups from 4th Assault and 51st armies	Corps and division commanders	Commanders of 4th Assault and 51st armies
	Army reconnaissance departments	Same	Same
	According to army plans	Same	Same
	Combat engineer companies from rifle divisions	Chiefs of army engineer troops, commanders of rifle corps and rifle divisions	Same
	100 mock-ups for each army (4th Assault and 51st armies)	Chiefs of engineer troops, corps and division commanders	Same
	100 mock-ups for each army (4th Assault and 51st armies)	Same	Same
	15 tanks each from armies (4th Assault and 51st armies)	Commanders of armored and mechanized troops of 4th Assault and 51st armies	Commanders of 4th Assault and 51st armies
	37th and 60th pontoon battalions from 9th Pontoon Bridge Brigade	Chief of staff of front engineer troops	Chief of front engineer troops

Measures	Men and equipment	Commanders	Overall commander
i) organize radio deception of enemy about offensive by 4th Assault and 51st armies	By designation of army chiefs of staff	Chiefs of staff of 4th Assault and 51st armies	Commanders of 4th Assault and 51st armies
j) increase air combat at enemy strongpoints and nearby lines of communications; bomb Dzhukste, Tukums, Tekava, Sloka	By designation of commander of 3d Air Army	Chief of staff of 3d Air Army	Commander of 3d Air Army
II. Measures in zone of 43d Army and of 2nd and 6th guards armies			
1. Maintain strict camouflage discipline in troop dispositions			
2. Organize control service in troop concentration areas			
3. Develop and reinforce defense of 43d Army and of 2d and 6th guards armies:			
a) dig supplementary trenches in depths of regimental defenses	Troops of 43d Army and of 2d and 6th guards armies	Corps and division commanders	Same
b) conduct false mining of forward edge of defense	29th, 30th, and 28th combat engineer brigades	Chiefs of engineer troops of 43d Army and of 2d and 6th guards armies	Same
c) install wire obstacles on forward edge	Troops of 43d Army and of 2d and 6th guards armies	Corps and division commanders	Same

Appendix 7. Camouflage Plan for the Primorye Group.

Order	Measures	Time in days	Required forces	Required equipment
1	Prepare equipment mock-ups	10	1 engineer battalion	
2	Conduct rail transport of rifle corps simulation teams, 2 tank brigades, and 1 artillery division from Iman station to Zaysanovka station	10	2 rifle battalions, 1 engineer battalion, 2 camouflage companies	12 railroad echelons for shuttles
3	Conduct motor transport of rifle corps simulation teams from Kamen-Rybolov to Barabash	10	1 rifle battalion, 1 camouflage company	20 vehicles, 20 tons of fuel
4	Simulate concentration areas of 7 rifle divisions, 2 tank brigades, and 1 artillery division	3	2 rifle companies, 2 camouflage companies	
5	Feign preparation for an offensive by 2 rifle corps and 1 rifle division	15	Forces of 25th and 35th armies	
6	Simulate reconnaissance of offensive axes	3	Forces of 25th and 35th armies	
7	Conduct motor transport in vehicles from rifle corps simulation teams between unloading and concentration areas	5	2 camouflage companies	
8	Simulate air reconnaissance of breakthrough sectors	15	3 aircraft	For 10 flights
9	Operate radios	15	1 communications company	10 radios
10	Build false airfields	5	1 airfield service battalion	

PART II: CAMOUFLAGE OF ACTIONS BY GROUND FORCE SUBUNITS

U.S. EDITOR'S KEY TO MAP AND DRAWING ABBREVIATIONS

CD/BMS—chemical decontamination/battalion medical station

cm—centimeter

Cpy—company

hr—hour

km—kilometer

m—meter

mm—millimeter

MRC—motorized rifle company

RRB—railroad battalion

SB—ski battalion

Introduction

The Soviet people, in bringing to life a grand program of building a Communist society, constantly bear in mind the intrigues of imperialism. The Central Committee of the Communist Party of the Soviet Union and the Soviet Government show great concern for strengthening the defense capability of our country and for reinforcing the might of the Soviet Armed Forces and increasing their combat readiness.

Aggressive circles in the imperialist nations are preparing to unleash a new world war. In doing so, they are devoting great attention to the organization of extensive intelligence and subversive activity against the socialist countries. To conduct their intelligence, they are using advanced means based on the latest achievements in science and technology.

The success of combat operations depends greatly on a correct estimate of the enemy by the warring sides. To prevent the enemy from conducting intelligence or to cause the enemy as much difficulty as possible in receiving intelligence about the true disposition of troops, their operations, and their intentions is an important mission in modern combat. Camouflage has an important place in executing this mission.

Great attention was devoted to tactical and operational camouflage in the Great Patriotic War. Where camouflage was skillfully used, troop operations were always successful.

The role of camouflage has grown greatly in modern warfare because of the use of nuclear weapons. Well-conducted camouflage can deceive the enemy about the combat strength of troops, their true disposition, and plan of operations. As a result, the enemy is unable to conduct combat operations purposefully and to use its weapons effectively. On the other hand, troops that have used camouflage skillfully win moral and material superiority over the enemy. Their operations will come by surprise, permitting the battle to be won with less effort.

Concealment causes the enemy difficulty in conducting reconnaissance and reduces the enemy's ability to hit troops and objectives, including with nuclear weapons. But, to completely conceal troops and their operations from an advanced reconnaissance apparatus is not easy. By conducting systematic reconnaissance, the enemy is able to discover targets of interest. If false objectives are laid out when concealment is used,

and if diversions are organized, it is possible to confuse the enemy, to force the enemy to concentrate its forces against the false objectives, and to force the enemy to use its weapons on these false objectives in vain. Camouflage therefore must be widely used when positions and areas are prepared by the engineers and when troops employ dispersion and maneuver.

Conducting camouflage today is considerably more complicated than in the last war.

First, a likely enemy has at its disposal more advanced means of reconnaissance permitting the observation of troops and objectives from the ground and from the air both night and day and in bad weather.

Second, the increased quantity of weapons, combat equipment, and transport in units and subunits, and the need to fortify areas and positions, leads to a sharp increase in the signs by which troops are discovered. As a result, the volume of camouflage has increased greatly.

Third, the sharp reduction in the time for battle preparation, the high rates of attack, and the speed of operations have reduced the time devoted to conducting camouflage.

All this shows that serious attention must be devoted to camouflage. Correct understanding of its role and the ability to make timely use of it in specific situations will help units and subunits to conduct operations more successfully.

Chapter 1. Fundamentals of Tactical Camouflage

Tactical camouflage is an important means of supporting operations by ground force units and subunits. Its main purpose is to cause enemy reconnaissance to collect false data about our troops and objectives.

Camouflage consists of coordinated measures conducted to mislead the enemy about combat strength, combat readiness, disposition, intentions and operations, locations, assignments, and state of objectives.

The purpose of tactical camouflage is to ensure the surprise and effectiveness of operations by units and subunits and to support their fighting efficiency and increase the defense of troops and objectives against enemy weapons. To achieve this, camouflage must be carried out in all types of combat and in any situation.

The main mission of tactical camouflage is to mislead the enemy about:

- the presence or composition and combat capabilities of troops;
- the purpose of their operations, especially of groupings of men and equipment; the axis of the main attack (or concentration of main forces); the type of maneuver;
- the disposition of troops on the terrain and the preparation of the areas and positions they occupy;
- the organization of the fire system;
- the organization of command and control;
- the purpose, location, and condition of objectives, and so forth.

The enemy, by using different types of reconnaissance, can reveal troops, determine their composition, operations, and intentions, and discover and identify military objectives from characteristic telltale signs, the main ones of which are the following:

- the disposition of subunits on the terrain, the type of equipment, the quantity of combat equipment, weapons, and transport;

—the number, size, and position on the terrain of areas and positions and their distance from the enemy and from one another;

—the type and density of engineer preparation of areas and positions;

—the movement of subunits, the length and composition of march columns, and the direction of their travel;

—the system for conducting reconnaissance and fire, the operation of communications, and the content of information being transmitted;

—the vital activity of subunits (the transfer of personnel and individual vehicles; the appearance of tracks and paths; engine noise; the light from lanterns and headlights at night; light and smoke from fires, and so forth).

The composition of subunits and the type of military objectives can be determined by the enemy from the quantity and external appearance of equipment and installations (from their form, size, and shadows) and from the intensity of their heat radiation and reflection of radio waves.

The number and type of telltale signs depend on the operations of subunits and on the specific situation. The telltale signs presented by subunits in different troop operations are examined in more detail in appropriate chapters.

Tactical camouflage problems are solved by concealment, simulation, and feints.

Concealment consists of using those measures and means of camouflage that will prevent or hinder the enemy's discovery of telltale signs, and, from them, the troops themselves and their operations and objectives. Concealment is achieved by observing camouflage discipline and by using limited visibility, terrain camouflage properties, and technical means and methods.

Concealment is executed continuously by units and subunits without special orders from the superior commander or staff.

Simulation is the reproduction of telltale signs that are characteristic of real objectives. Simulation calls for creating false positions and dispositions for units and subunits. False objectives are created by using mock-ups and other types of camouflage, by building false installations, and also by showing signs of troop activity. Units and subunits are allotted the equipment needed for simulation.

Simulation was used widely in the Great Patriotic War. Here is one example showing the content of this camouflage method.

In the summer of 1943, units of the Voronezh Front, while improving their defensive positions, under orders of senior commanders created false massings of tank subunits and false positions for antiaircraft weapons and combat security.

Major Gudimov's combat engineers successfully simulated antiaircraft installations. They prepared nine gun mock-ups, and during the night they set up false antiaircraft batteries on the edge of a forest. To make the mock-ups, they used the wheels from destroyed tractors and rough-cut, painted poles. The mock-ups were set in prepared false emplacements and were carelessly "camouflaged."

In the morning a fascist reconnaissance aircraft appeared over the forest. The combat engineers used smoke powder to simulate the firing of individual guns. Within a half hour a group of nine Ju-88 bombers appeared. The combat engineers on duty at the mock-ups set fire to packets of gunpowder prepared ahead of time to simulate weapon fire, and took cover. The Junkers turned away, dropped their bombs one after another, and flew off.

The combat engineers had hardly restored the overturned and damaged mock-ups and replenished the gunpowder packets when once again the reconnaissance aircraft appeared, and following it—two flights of Junkers. In a single day, the fascist bombers hit the false objective six times and dropped 117 bombs.

Feints consist of a planned show of movement, concentration, and operations by real subunits. They are carried out to hold enemy forces on a secondary axis or to show a concentration of a large number of troops in specific areas. A feint is usually carried out with limited forces and equipment and with specially detached units and subunits. The subunits conducting the feint may not even know the true target of their operations. This appears to be a combat mission for them. Let us give one example of a feint.

To take control of the Velikiye Luki-Rzhev railroad and of the withdrawal route of the enemy's Toropa grouping, a ski detachment was assigned the mission of seizing the Staraya Toropa railroad station.

After completing a march away from roads and through forests, and by using gaps in the enemy's defense, the ski troops, at night, reached Staraya Toropa, where there was a large enemy garrison. To seize the station, the detachment commander decided that part of his forces would

take control of the road to Ilino (south of Staraya Toropa), and a small group would feign an attack on the village from the north to attract the attention of the fascists and lure them out of the village. Then, the main forces of the detachment were to make a strike from the east along the railroad to seize the village and destroy the enemy garrison (figure 1).

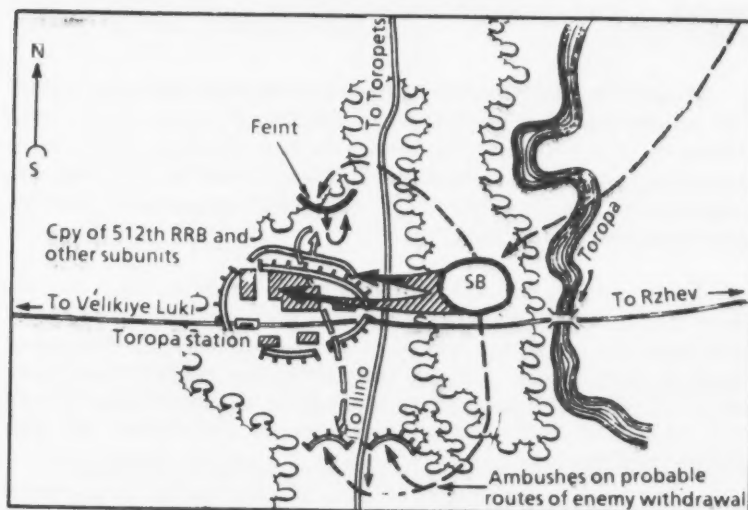


Figure 1. Attack on Staraya Toropa by a ski detachment employing feints.

The appearance of a small group of ski troops from the north drew the attention of the fascists. At this time, the main forces of the detachment struck from the woods along the railroad at the rear and right flank of the Hitlerites and crushed them with the unexpected attack. Caught by surprise, the enemy could not take cover in the village. The enemy put up no resistance, fled in panic along the only road to Ilino, ran into the ambush, and suffered great losses. After seizing the village and the station, the detachment destroyed the remainder of the enemy.

Camouflage can produce great results when concealment is combined with simulation or feints. However, if concealment is carried out by troops without orders from the superior commander, then simulation and feints must be employed carefully: false objectives and feints can be used to make the enemy concentrate large forces. Conducting such measures without coordination can seriously complicate or entirely disrupt execution of the combat mission by adjacent units. Thus, during operations as part of a unit, simulation and feints must be carried out only with the permission of, or under orders from, the unit commander. Broad initiative and creativity in selecting methods to conduct camouflage are given to subunits operating apart from their units.

When executing camouflage missions, troops must be guided by specific requirements, the most important of which are aggressiveness, persuasiveness, continuity, and diversity.

Aggressiveness in camouflage is of decisive importance. It is shown by persistently striving to give the enemy a false idea about the combat composition and grouping of subunits, the type and intent of their operations, place of disposition, and so on. It is important to make the enemy incorrectly estimate the situation and to provoke enemy action favorable for our troops.

The Great Patriotic War provided many examples of the aggressive use of camouflage on the enemy. Let us cite one of them.

In September 1942, on one of the sectors of the North Caucasus Front, a rifle company commanded by Senior Lieutenant Didenko was ordered to defend an important mountain pass. The company, reinforced with several antitank guns and mortars, covered the road leading to the pass. There was a good natural obstacle ahead—a rather narrow but wild mountain river 1.5 to 2 meters deep with a steep opposite bank inaccessible for enemy tanks. The bridge across the river had been destroyed.

On orders from the company commander, the antitank crews prepared areas on the forward slopes for conducting direct fire to cover the only possible route for tank traffic—the road. Before opening fire, the guns were deployed in prepared and camouflaged shelters on the reverse slopes. The mortarmen were there too, keeping the approaches to the river under fire. The heavy machine gun crews had also dug trenches on the reverse slopes, permitting them to conduct flanking fire along the river. Some of the rifle sections occupied positions near the foot of the peaks; others were on the forward slopes. The riflemen dug foxholes for themselves and camouflaged them well with branches and grass. A small supply of mines was used to cover the approaches to the river on the enemy side.

A reconnaissance group of fascist motorcyclists accompanying three tanks approached the destroyed bridge toward the end of the day. The surprise fire of the company stunned the enemy. Two enemy tanks were knocked out, while the third one was blown up on the minefield. The fascist scouts withdrew after losing 30 men killed and wounded.

The company commander correctly concluded that an enemy attack would follow in the morning. He ordered that the foxholes be connected by communications trenches, that observation posts be built for himself and for platoon commanders, and that all installations be carefully camouflaged. Simultaneously, false fire positions for artillery and false trenches for riflemen were prepared not far away. By morning, all the work was finished.

An enemy reconnaissance aircraft appeared at dawn, and soon fascist bombers as well. A group of nine aircraft made several passes and dropped their lethal cargo on the false strongpoint without noticing the real one.

Immediately after the air strikes, up to a battalion of motorized infantry with river crossing equipment moved to the river. The Hitlerites, convinced that our defense had been neutralized, began to erect a crossing, but were unexpectedly met with heavy artillery, mortar, and machine gun fire. After suffering considerable losses in men and crossing equipment, the enemy gave up the attempt to force the river and withdrew.

The skillful simulation in this example had a powerful effect on the enemy, forcing it to attack a false strongpoint. Thus, skillful organization of defense in combination with camouflage, along with the courage and quick thinking of personnel, ensured surprise of operation for the company. It also decided the outcome of the battle.

Persuasiveness in camouflage consists of suiting the camouflage to the situation and of giving the enemy an impression of reality and probability. For example, when concealing objectives, it is necessary to make them blend in with the terrain or with typical local objects that do not attract attention. False objectives should be created in those places where they fit into the setting; they must be similar enough to actual objectives not only in appearance but also in activity.

Let us give such an example to show the persuasiveness of camouflage carried out with feints.

A rifle platoon, after securing a village, was consolidated in it. The enemy overlooked from a dominant height a road that passed along the bottom of a ravine from the populated area into a forest. The platoon commander decided to use this to feign the concentration of a large force in the captured village. The platoon commander sent some of the soldiers, under the cover of bushes, into the forest, and then directed them back again along the ravine to the populated area. Thus, during the afternoon, groups of soldiers in various numbers several times feigned an approach to the populated area and showed the concentration of a large number of troops there. As darkness came, the platoon opened intense fire and attacked. Thinking that large forces were concentrated in the village, the fascists did not engage in battle and hurriedly withdrew. The platoon took over the enemy positions and in doing so captured prisoners. The prisoners said that from the count of their observers about 200 soldiers with heavy and light machine guns were concentrated in the village by evening.

This example shows how persuasive feints permitted a rifle platoon to gain victory over superior enemy forces.

Continuity in camouflage calls for continuous and timely execution of camouflage in any situation: in preparation for and during combat, on the march, and during disposition for a halt. Camouflage materials must be constantly renewed and replaced. Belated application of camouflage techniques may prove not only useless but even dangerous.

Unlike during the Great Patriotic War, when camouflage was skillfully used in preparing for battle but was not always provided for during combat, today the need for continuity is especially important.

Diversity means avoiding routine when carrying out camouflage and when choosing camouflage means and methods. Identical methods used for concealment or for the creation of false objectives, when repeated several times, will sooner or later be revealed and recognized by the enemy. Repetition is impermissible in camouflaging both troop operations and individual objectives.

The actions ensuring the execution of camouflage missions are customarily divided into organizational measures and engineer and technical methods.

Organizational measures provide for accomplishing camouflage missions without using engineer and technical means. These measures include:

- using terrain camouflage properties, darkness, and other limited visibility;

- observing military secrecy and the demands of concealed troop control and camouflage discipline;

- dispersing troops and changing the areas they occupy.

Organizational measures also include feints conducted by subunits.

Engineer and technical camouflage methods call for using regulation concealment and simulation devices, industrially produced materials, and local materials; engineer equipment is used as well. Included here are:

- camouflage painting;

- artificial screens;

- deceptive contours for installations;

- camouflage treatment of the terrain;

- vegetation;
- mock-ups, other means of simulation, and false installations;
- smoke and blackout devices and sound and radar masking.

Adapting troops and objectives to the terrain is of decisive importance in camouflage. This adaptation includes the skillful use of the terrain's concealment properties and appearance.

Typical of the concealment properties of terrain are natural screens: forests and other tree and plant growth, the uneven contour of the land, populated areas, and various local objects. Using terrain concealment properties means occupying natural screens and dead ground (terrain not observed by ground reconnaissance) for concealed disposition of units and subunits and for engineer preparation of areas, positions, and lines. It also means selecting and using traffic routes to make maximum use of natural screens and dead ground when organizing and conducting operations and carrying out marches. Skillful use of natural screens and dead ground ensures complete or partial concealment of troops and objectives from optical, thermal, and radar detection by enemy reconnaissance with minimum loss of men, equipment, and time.

Natural screens must be used not only in concealing troops and their operations but also in creating false objectives. However, the adaptation to the terrain must be such that the enemy will notice the main telltale signs and draw the necessary conclusions. Here is an example of skillful use of terrain concealment properties.

During the withdrawal of our troops in August 1941, a battalion of a howitzer artillery regiment was ordered to prevent the enemy from crossing to the left bank of the Dnepr River near Nizhnedneprovsk. One of its batteries was to occupy a fire position near Igren station. Two small groves were west of the station, and between them was a new garden that was not on the map and not observable from the enemy side. Fire positions were selected with this in mind: the main one was in the garden, alternate positions were on the village outskirts, and two false ones were in the groves (with the permission of the battalion commander). By the designated time, the artillerymen had dug and carefully camouflaged emplacements at the real position, while false areas were prepared and gun mock-ups were set up at the false positions.

For 3 days the battery conducted fire, inflicting great losses on the enemy. After seeing the false positions and taking them for real ones, the enemy made several heavy fire assaults. The invulnerability of the battery drove the enemy to fury. The eight Junkers called in circled over the

artillerymen for a long time and, not finding the battery, dropped their entire lethal cargo on the false fire positions. Thus, the correct selection of natural screens and their skillful use for concealment and simulation made it possible for the battery to successfully execute its combat mission and avoid losses.

If there are no natural screens, use is made of the terrain's appearance—its color and outline. For positioning equipment and transport, and for building fortifications, sectors are chosen whose color is closest to that of the objective; places are also chosen that border on areas of different colors. This makes it possible to make equipment and installations less conspicuous to enemy optical reconnaissance and simplifies their concealment by engineer and technical methods.

Camouflage is more difficult on level solid-colored terrain lacking in natural screens. The camouflage properties of such terrain can be improved by artificial spotting, that is, by the creation of spots that differ in color and brightness from the surrounding background.

The use of artificial screens must be seen as an additional measure to the use of the terrain's concealment properties and appearance. Where natural screens are absent entirely or are lacking in number, artificial screens are the main means for concealing troops and objectives. But here, adaptation to the terrain is of primary importance.

Artificial screens can be made of local materials or from regulation camouflage devices. Screens, as a rule, are made inconspicuous. This is achieved first of all by giving them a shape similar to local objects and by matching their color and surface structure to the surrounding background.

When troops and objectives are put into position on the terrain, it is important to make sure that they are not next to extremely conspicuous local objects that could be used by the enemy as reference points. If such proximity can not be avoided, the reference points must be destroyed.

Darkness and other limited visibility contribute to camouflaging troops and their operations. They must be used to the fullest to conceal the movements of subunits, the conduct of engineer missions—especially when close to the enemy—the conduct of reconnaissance by fighting patrol, the concealed transport of equipment, and so forth. However, in organizing troop operations at night and in bad weather, subunit commanders must consider the increased capabilities of enemy reconnaissance and use camouflage against enemy radar and night vision instruments.

In winter, when there is snow cover, the camouflage of troops and objectives is more difficult. Painting equipment white and providing

personnel with camouflage suits reduces conspicuousness on the battlefield. Standard authorized winter camouflage sets conceal equipment and fortifications on a snowy background, and snow is widely used for camouflage. The long winter nights, snowfalls, and blizzards contribute to concealing the execution of different combat missions.

An integral part of camouflaging troops and objectives is the observance of military secrecy and camouflage discipline by personnel. Observance of military secrecy means that personnel are not allowed to discuss the combat strength and equipment level of units and subunits, the assigned combat mission and plan for troop operations, and the time for starting combat. Commanders and staffs are obliged to constantly see that personnel maintain high vigilance to prevent possible loss of documents and discussion of information of interest to the enemy.

Camouflage discipline is the rules and requirements for troop conduct that are generally accepted or that are established for a specific situation and that are aimed at achieving camouflage goals.

Depending on the troop operations and the situation, the movement of personnel and vehicles in specified places can be limited or forbidden (in certain zones or on certain roads), as can be making tracks on open terrain, using headlights and lamps without blackout devices, lighting stoves and foraging for wood, and sending radio transmissions. Specific rules are also established for conducting fire to prevent revealing its plan before the start of combat, as are rules for the use of night vision devices and radar sets, the order of troop movement, the transport of equipment, and the preparation of positions and areas.

For camouflage to succeed, one must know how to organize it. Organization includes determination of the camouflage missions and the sequence and time of their execution; presentation of the assignments to those who will fulfill them; preparation of the men and equipment for carrying out camouflage; and the conduct of systematic control over the timely and efficient execution of camouflage.

The commander of each battalion, company, artillery battalion, and battery personally organizes camouflage and directs the operations of subordinate units. In determining the camouflage missions and means of executing them, he proceeds from the plan for the coming operations and from the orders of the superior commander or staff.

When organizing camouflage, the subunit commander takes into account the forms and means of enemy reconnaissance; the telltale signs of his subunit in a specific situation; the terrain camouflage properties; the weather; and the season and time of day. Proceeding from this, he outlines

the sequence for carrying out camouflage and, at the same time that he sets forth the combat missions, he gives his subordinate subunits orders on executing camouflage.

The following topics should be considered in these orders:

- methods to conceal personnel, combat equipment, weapons, transport, and fortifications by using natural screens, limited visibility, and regulation devices and local materials;

- measures for creating false objectives and for conducting feints; the men and equipment detached for this;

- requirements established for camouflage discipline and the measures to maintain it;

- time and sequence for executing camouflage. If necessary, the order for coordination of the men and equipment taking part in executing the camouflage is also indicated.

The execution and the quality of camouflage are systematically supervised. Camouflage quality is checked by directly inspecting the objectives being camouflaged and by observing them with optical devices and night devices from specified distances.

Achieving the camouflage goals set forth calls for a display of great creativity, initiative, and ingenuity by all personnel in the selection of camouflage means and methods and for high vigilance and strict compliance with the established rules of camouflage discipline.

Chapter 2. Capabilities of Enemy Reconnaissance to Detect Troops and Objectives

When camouflage is conducted, the capabilities, features, and defects of modern equipment and detection methods must be considered.

Depending on the type of troop operations, the objectives, and distance from the enemy, camouflage can be detected by ground reconnaissance, air reconnaissance, or by radar and special reconnaissance equipment.

Ground Reconnaissance

Ground reconnaissance is conducted in the armies of capitalist countries by organic reconnaissance units and subunits and by observers and patrols detached from motorized infantry, tank, infantry, and artillery units and subunits.

For example, in the mechanized (armor and infantry) divisions of the U.S. army, ground reconnaissance companies of a reconnaissance battalion are called on to conduct ground reconnaissance; in motorized infantry (infantry and tank) battalions, reconnaissance platoons are used.

During an offensive, information is mainly acquired by patrols and by sabotage and reconnaissance groups (or patrols) that penetrate our troops in depth to reveal nuclear weapons, troop groupings, defense works, and the type and extent of engineer preparation of positions and areas, and to organize attacks on weakly defended objectives to capture prisoners and to secure samples of armament. Observation posts may also be created. In defense, the observation posts and patrols conduct ground reconnaissance, carrying out missions by observation, ambush, and combat.

Patrols and sabotage and reconnaissance groups may use optical instruments, infrared devices, and sometimes short range radar to conduct reconnaissance by observation. Reconnaissance is conducted from observation posts with the naked eye, optical and infrared devices, photographic equipment, and radar and sound-ranging equipment.

Optical instruments expand the capabilities of visual observation. They make it possible to observe objects from great distances and to reveal

their finest details. Calculations show that optical devices with 15-power magnification make possible in good visibility the identification of objects 10 centimeters and larger in diameter from 1 kilometer.

Cameras can be used to photograph objects over the entire line of sight. The use of films that are sensitive in the near-infrared part of the spectrum makes it possible to separate a camouflaged objective from the background, which can not be done with the naked eye. Repeated photography of the same area makes it possible to determine changes in the situation and to discover new objects by comparing photos.

Devices for observation and photography ensure that reliable information is received, but they can be used only in the daytime with good visibility. The skillful use of terrain camouflage properties and of limited visibility and the employment of local and regulation camouflage devices and smoke screens are the main measures for counteracting these detection methods.

Conducting reconnaissance at night calls for wide use of infrared methods. For example, U.S. army units and subunits are equipped with electronic optical devices that ensure battlefield observation and the conduct of fire, signalling, and detection of sources of enemy infrared light. Devices for observation and for conducting fire are made abroad in two forms: illuminating (which operate by illuminating the terrain and objectives with infrared light) and non-illuminating (which operate with the natural night illumination). Their range is about the same: for sights for small arms, up to 300 to 400 meters, and for gun sights and observation devices, 1,000 to 1,500 meters.

With the aid of signalling devices, sources of infrared emission are detected from much greater distances than the range of operation of gun sights and observation devices. Typical of non-illuminating devices and signalling equipment is total secrecy of operation.

The enemy's use of night vision devices makes the operations of our troops in direct proximity to the enemy more difficult. Those same methods are used to conceal equipment and installations from infrared observation as are used against reconnaissance by optical devices. Camouflaging the operation of our night vision devices can be achieved by turning them on for short periods while frequently changing position, and also by using false sources of infrared emission.

Besides refining night vision devices, U.S. military experts are working to create instruments that detect objects from their thermal radiation—thermal direction finders and thermographs. With their aid, it is possible to detect combat and transport vehicles, guns, and other equipment that

emit heat. These instruments have complete secrecy of operation. The American press has reported on the tests of two thermographs. The assumption is that these instruments will become part of the armament of motorized infantry companies in the U.S. army.

Radar is widely used to detect objects at night and under limited visibility (heavy fog, precipitation, smoke-filled atmosphere). The foreign press has noted that radar supplements existing capabilities for battlefield observation without replacing other observation devices.

For example, in the U.S. army, motorized infantry, tank, and reconnaissance battalions each have six radar sets. The AN/PPS-5 is for short range (up to 10 kilometers), while the AN/TPS-33 is for moderate range (up to 18 kilometers). The resolution capabilities of the sets is 1 to 3° in direction and 40 to 60 meters in range.

Using the principle of selecting (separating) the reflected signals of moving objectives from among all the signals reflected by the terrain and various objects, radar can easily detect moving targets. Targets are indicated aurally (by a change in sound tone) and visually (by blips on a cathode ray tube). When operating in another mode, radar can detect stationary military objectives. However, identification is made more difficult by the great number of similar signals reflected by local objects.

According to foreign views, radar positions are chosen on the forward slopes of hills from 2 to 4 kilometers from the forward edge. A large number of radar sets permits the enemy to deploy two or three sets on a 1-kilometer front. This ensures that a dense radar field will be created over the entire depth of combat formations of the first echelon battalions.

In recent years, the Americans have tested several small short-range (up to 3 kilometers) radars. They can be mounted directly on guns and used to conduct aimed fire day and night.

In many armies in the capitalist countries, radar is also used in artillery units. This radar is designed for spotting with great accuracy (from the trajectory of the shell or mortar) artillery and mortar batteries that are conducting fire, but it can also be used for reconnaissance of equipment in motion.

The use of radar for reconnaissance of moving targets severely complicates the camouflage of troop movements. Natural screens and dead grounds are the main measures used against radar reconnaissance. Special radar camouflage that takes into account the capability to select moving targets is called for on terrain under observation.

High-powered optical instruments, cameras with telephoto lens, and medium range radar permit the enemy to conduct reconnaissance to a depth of 15 to 20 kilometers and more. But uneven terrain, dense forests, and other local objects sharply reduce the range of observation with these devices. Foreign literature notes that on moderately broken and semi-open terrain the depth of ground reconnaissance does not exceed 3 to 4 kilometers; only on certain axes does it reach 8 to 12 kilometers. In carrying out camouflage it is thus necessary to learn to quickly determine and make full use of dead grounds formed behind natural screens.

The foreign press has mentioned that, along with the individual reconnaissance devices used to conduct ground reconnaissance, reconnaissance systems have been developed and are being used that combine several devices with different methods of detection.

The use of such systems can cause great difficulty during concealed operations by subunits of our troops that are in direct contact with the enemy.

Air Reconnaissance

The opinion is held in NATO armies that air reconnaissance is the main form of reconnaissance. It is capable of collecting reliable data extremely efficiently and of providing staffs with essential intelligence.

For example, to locate an enemy that is in direct contact, the American army uses army aviation from formations, large units, and certain units of the ground forces. Helicopters, light piston-engine aircraft, and pilotless systems are used.

Army aviation conducts close reconnaissance in close cooperation with ground reconnaissance subunits. According to plan, and in the interest of the troops, army aviation is responsible for air reconnaissance to a depth of 100 kilometers from the front line.

Units and subunits of our troops at a greater distance from the enemy (in dispositions or on the march) can be detected by air force reconnaissance aircraft.

Air reconnaissance is usually conducted from helicopters of army aviation at low altitudes by visual observation alone. From fixed-wing aircraft, air reconnaissance is conducted by visual observation, photography, radar, and infrared devices.

Visual observation is carried out from the air by helicopter and fixed-wing aircraft crews independently and during the conduct of other missions. The main advantage of visual air observation is the ability to rapidly investigate terrain and instantly relay intelligence data by radio. In carrying out camouflage, it is important to know and to use the defects in this reconnaissance method: the dependence on the weather, the virtual impossibility of using optical devices, and the lack of trustworthiness and the subjectivity of data collected during counteraction by anti-aircraft weapons. Despite these defects, visual observation is considered one of the main methods for air reconnaissance of troops on the battlefield and on the move. The foreign press has noted that in individual periods of combat in Vietnam the Americans visually detected about 80 percent of the jungle objectives subjected to air attack.

The ranges for visually detecting and identifying troops and objectives on open terrain from the air are given in table 1.

Table 1. Maximum ranges for air observation of uncamouflaged objectives during daylight with high visibility.

Objects under observation	Altitude, kilometers	Slant range, kilometers: Detection	Slant range, kilometers: Identification
Combat and transport vehicles outside of emplacements and shelters	0.1 0.6-1 6-10	4-5 6-9 10-15	2-3 3-5 Not identified
Combat and transport equipment in emplacements and shelters	0.1 0.6-1 4	3-4 6-7 7-8	1.5-2 3-5 5
Artillery and anti-aircraft weapons in fire positions	0.1 0.6-1 4	2-3 3-4 5	1-1.5 2-3 Not identified
Trenches, communication trenches, artillery emplacements	1 4 6-8	2-3 5-7 10-12	1.5-2 5-6 9-10
Bridges and other crossings	8-10	15-20	15-20

Uneven terrain and local objects make observation much more difficult. Skillful adaptation to the terrain and the use of engineer and technical concealment methods can sharply reduce the effectiveness of enemy air reconnaissance by visual observation.

Photography is the most important method of air reconnaissance. Photography makes it possible to determine quite accurately the coordinates of targets near the enemy and deep in the rear. The foreign press notes that in credibility, volume, and quality of information, and in simplicity and relative speed of interpretation, aerial photography is superior to other air reconnaissance methods, in particular, to reconnaissance with electronic devices.

Different types of photo equipment permit vertical and oblique photos to be taken at a wide range of altitudes, at any flight speed, and by day and or night. However, in recent years, as foreign experts report, there has been a tendency to conduct photo reconnaissance at low altitudes to avoid destruction of reconnaissance aircraft by antiaircraft guided missiles.

Photographic systems have devices that automatically adjust the film advance according to aircraft flight speed and adjust aperture setting and shutter speed depending on the light available. This ensures high quality pictures. Calculations show that objects 20 to 40 centimeters in size or larger (their details) can be distinguished in photographs; on large photos (detailed photo reconnaissance) objects as small as 3 centimeters can be interpreted.

To take photos at night, special survey cameras and illuminating devices are used (photo flares, illumination rockets, and electric photoflash bulbs that range from several million to several billion candlepower).

Night photos are also of high quality.

When taking photos, black and white films that are sensitive in the visible range of the spectrum (panchromatic) and in the near infrared region (infrachromatic) can be used, as can color spectrozonal films. Infrachromatic and spectrozonal films make it possible to reveal objects unsuccessfully camouflaged under surrounding plant growth.

Recently, the use of a method to intensify the contrast in photographs has become common in photo reconnaissance. In essence, the contrast of individual details in a photo is selectively intensified by weakening the background image. This greatly improves the possibilities for interpreting objects.

Much attention is being devoted to shortening the processing time of aerial photographs. The American army and air force have ground processing systems that produce finished photos 5 to 15 minutes after their delivery. Some types of reconnaissance aircraft have equipment on board to process aerial photographs in flight and to drop the developed film at intelligence collection points.

To camouflage troops and objects from aerial photography, the same means and methods are used as for camouflage against visual observation. At the same time, the capability to take high quality pictures and the use of special photo materials demand that camouflaged objects be more carefully adapted to the terrain, that non-detectable camouflage materials be selected for painting equipment, and that artificial screens be built.

When creating false objectives, mock-ups and false installations must be highly detailed.

Aerial radar reconnaissance has been used more and more widely in recent years. Unlike visual and photo reconnaissance, it can be conducted not only day and night, but in any kind of weather and in any climate.

An extremely important achievement abroad in the development of radar technology has been the creation of side-scan radar. This radar ensures terrain observation from high, medium, and low altitudes in two wide zones along an aircraft's flight path. At high altitudes, the radar's range of operation is 80 kilometers. Because of special antennas, the resolution of the side-scan radar is much greater than that of ground sets.

The side-scan radar's high resolution and ability to indicate moving targets ensures certain detection at maximum range of advancing troops on open and partially covered terrain, and also of any objects on water. Combat and transport equipment positioned outside of emplacements and shelters can be detected on open terrain. But the conventional rendering of images on the radar screen still creates certain difficulties in identifying stationary objects.

When camouflage is conducted against radar reconnaissance, it is important to fully consider that side-scan radar will not detect troop dispositions in forests and in other natural screens or near local objects; nor will it detect combat and transport equipment on open terrain in emplacements and shelters. The conventional rendering of the radar image of terrain and objects makes it possible, with the aid of radar camouflage equipment, to deceive the enemy about the presence of troops in specific areas.

Infrared reconnaissance is conducted from the air with a device that reveals objects from their thermal radiation. This device is capable of detecting combat equipment and transport (from the surfaces heated by the running of the engines), other objects that emit heat, and even people. But infrared equipment is not effective in rain or heavy clouds (because the temperature of terrain and objects is equalized). Thermal images of objects and terrain are recorded on film, which is then developed at ground stations. Preliminary results of infrared reconnaissance can be received 15 minutes to 1 hour after an aircraft has landed, while 6 to 8 hours are needed for close analysis.

To achieve concealment against infrared reconnaissance, thermal radiation from objects must be reduced. This is done by shielding heated surfaces with obstacles impenetrable by infrared rays and by using heat insulating materials (asbestos, fiberglass, and so forth). Placing equipment

in emplacements and shelters also reduces the intensity of thermal radiation. False heat-emitting targets can be used to deceive the enemy.

Typically, most reconnaissance aircraft are fitted with several types of reconnaissance equipment. Conducting reconnaissance simultaneously by different methods makes possible the collection of the most reliable information. And this also greatly complicates the conduct of camouflage.

There is information in foreign literature on attempts to develop reconnaissance devices that record changes in the magnetic, electrical, and gravitational fields caused by combat equipment and weapons on the terrain. It is entirely possible that in the future the need will arise to conduct camouflage against such reconnaissance, but for now this is premature.

Signals Intelligence

The NATO countries have special units and subunits in the ground forces to conduct signals intelligence. These units have highly sensitive radio receivers and directional antennas. Signals intelligence can be carried out by listening to radio transmissions and by taking bearings of radio stations from several points. Signal intercept posts are deployed 3 to 5 kilometers from the forward edge close to the first echelon battalion and brigade control posts. The range of signals intelligence is almost equal to the radius of operation of our radios. Thus, when conducting camouflage by limiting or forbidding radio transmissions, transmission power can also be reduced. This will limit the range of the radios and their detection by the enemy.

Special Reconnaissance

Special purpose troops and a network of special agents are used to conduct special reconnaissance abroad. Special reconnaissance units and subunits in the U.S. army are special military formations created to carry out various subversive missions; conduct punitive operations against partisans and the local population; and organize assaults on control posts, communication centers, large depots, and other important objectives in the rear of our forces. Besides, they can also be used for reconnaissance.

The conduct of reconnaissance in our rear calls for dropping reconnaissance and diversionary detachments and groups (numbering 10 or more men) with communications and reconnaissance equipment. Their mission is to discover important objectives and to get information on troop

composition, disposition, and regroupings. Enemy agents can also be used for these purposes.

Similar reconnaissance missions are also assigned to reconnaissance and diversionary groups (or patrols) sent out from the reconnaissance battalions of the enemy's first echelon divisions. These groups can conduct reconnaissance to a depth of 75 kilometers from the front line.

Units and subunits of our forces that are out of contact with the enemy must carry out camouflage not only against air reconnaissance and signals intelligence, but also against special reconnaissance. Along with camouflage, security against surprise attacks by reconnaissance and diversionary detachments and groups must be provided for troops and objectives.

The probable enemy is devoting special attention to developing and improving reconnaissance equipment and the methods of conducting reconnaissance. The diversity of reconnaissance equipment and the outfitting of reconnaissance elements and reconnaissance aircraft with integrated reconnaissance systems demand an integrated approach to camouflage problems. Camouflage must be effective against all reconnaissance. At the same time, conditions do not always allow the enemy to use its entire arsenal of devices and means of detection. It is important to learn to correctly estimate the enemy's reconnaissance ability in a specific situation. This will make it possible to select camouflage methods and devices skillfully and to carry out camouflage successfully with the least expenditure of men, time, and equipment.

Chapter 3. Camouflage Equipment

Ground force subunits, in carrying out engineer and technical camouflage methods, use different devices that are usually divided into concealment devices and simulation devices. The concealment devices include individual camouflage gear (camouflage clothing); regulation camouflage sets and screens for concealment against optical reconnaissance; corner reflectors designed for radar jamming; and blackout and smoke devices. Simulation devices include equipment mock-ups and radar reflectors that reproduce radar signatures of equipment and installations. Smoke equipment is often also used to make false objectives appear real.

Standard and expendable industrially produced items are used first. When they are lacking or insufficient, troops make screens, mock-ups, and other articles out of local materials.

Camouflage Clothing

Camouflage clothing is used to conceal personnel from visual observation, photography, and other optical reconnaissance. Snipers, scouts, minelaying personnel, and others are provided with it. Items of camouflage clothing include camouflage coveralls and camouflage suits.

Camouflage coveralls (figure 2) are used during the snowless periods of the year. The coveralls consist of trousers, jacket, and hood sewn into one piece and made of cotton fabric in two versions: with one-sided and two-sided coloring. With two-sided coloring, the coveralls can be used on a background of vegetation or sand. With one-sided coloring, the coveralls are used on a background of just vegetation or of just sand (or sun-dried grass), depending on the color of the coveralls. The coveralls used against a background of green vegetation are particularly effective when local camouflage materials—grass, twigs, and other improvised items—are attached with tapes sewn onto the coveralls.

Depending on the kind of fabric from which the coveralls are made, their weight varies from 500 to 1,000 grams.

The coveralls are worn either over the uniform and equipment or over the underclothes. The coveralls have slits so that equipment can be operated. The coveralls do not hinder movement even when the wearer is crawling. The wearer's face is covered with a mask put on over the bare

head during operations in direct proximity to the enemy. After the mask comes a steel helmet covered by the hood.

A soldier wearing the camouflage coveralls and successfully adapted to the terrain can not be seen by the naked eye at a distance of 20 to 30 meters. The coloring of the coveralls has been chosen so that the coveralls are not revealed when observed in the infrared zone of the spectrum.

After a combat mission, the coveralls are dried, cleaned, and carefully stored. They must not be kept out in the sun too long because they will fade and lose their camouflage properties. To prevent this, the coveralls must be dried in the shade.

The *camouflage suit* (figure 2) is intended for camouflage against a background of snow. It is made of white cotton fabric and consists of a shirt with hood and loose-fitting trousers. The sleeves of the shirt have mittens attached. The shirt and trousers are stored in a bag made of a gray, khaki, or brown fabric. The camouflage suit is made in three sizes. It weighs 600 to 700 grams.

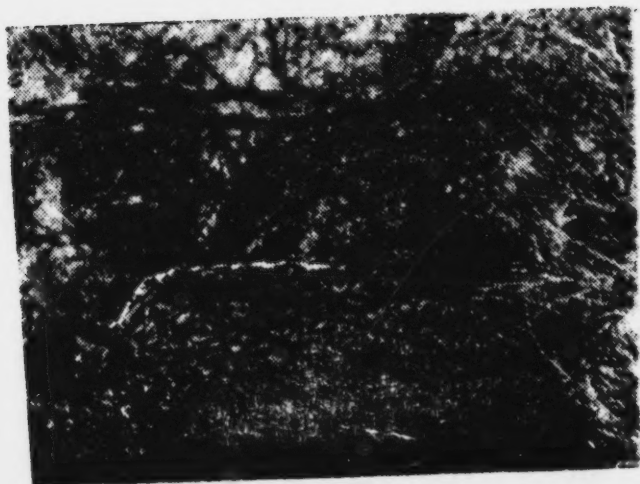
Regulation Camouflage Sets

Combat equipment, motor transport, and fortified installations are concealed from optical reconnaissance with the MKT regulation fabric camouflage sets and the multi-purpose frameless "Shater" net.

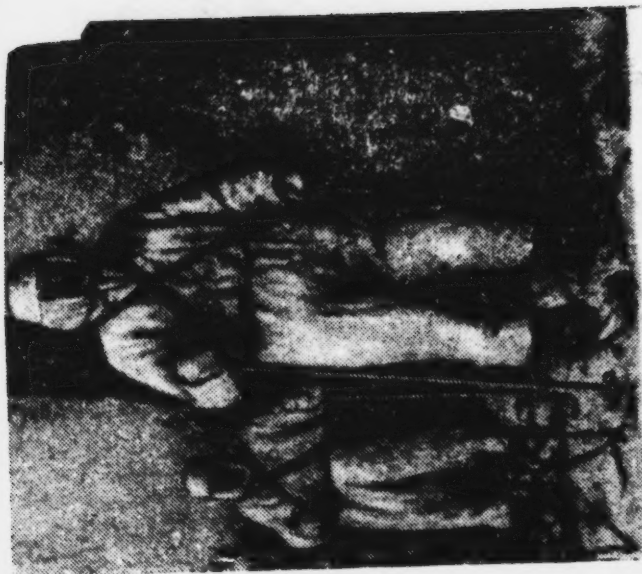
The *MKT camouflage sets* are produced in three types: the summer MKT-L (for camouflage on a background of green vegetation and bare ground); the transparent MKT-T (for camouflage on a background of green vegetation); and the winter MKT-S (for camouflage on a background of snow). The main parts of the MKT set are the camouflage cover and the pickets.

The camouflage cover is 12x18 meters. It consists of 12 standard interchangeable parts that are 3x6 meters. Such a design makes it possible to set up nets of various shapes and sizes. The parts of the cover are connected to one another by cords using blind and quick-release (or chain) seams. The chain seam makes it possible to quickly detach the cover when necessary, freeing a tank, gun, or other weapon in order to conduct fire or to move out from under the net. The sequence for making the quick-release seam is shown in figure 3.

The cover of the MKT-L set is made of cotton mesh fabric and is colored on both sides. The facing side is green with brown spots to conceal objects against a background of vegetation. The reverse side is a greenish



1



2

Figure 2. Camouflage Clothing.
1. Camouflage coveralls
2. Camouflage suit

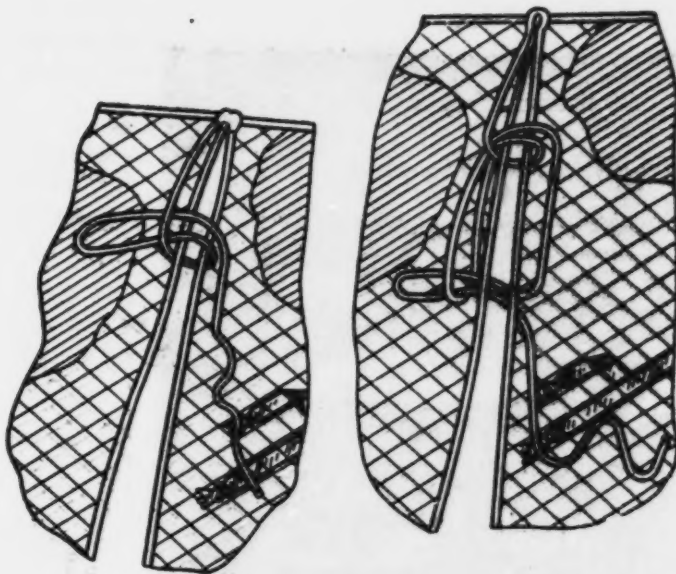


Figure 3. Making the quick-release seam.

earthy color and is used to camouflage objects against bare earth. Covers for desert-steppe terrain are grayish brown.

A cotton net with a 5x5 centimeter mesh forms the main part of the MKT-T set. Strips 5 centimeters wide and pieces of light green, dark green, and yellow fabric are attached to the net. The strips and pieces of fabric are placed evenly over the cover.

The camouflage cover of the MKT-S set is made of white cotton mesh fabric. Twenty-four wire pickets for securing the cover to the ground are included in each set.

Before transport, the cover and pickets are packed in a case made of tent fabric. The case can be used to camouflage glass and other bright surfaces on combat and transport vehicles in positions and in subunit dispositions. The sets are carried on the armor of tanks and inside trucks, armored personnel carriers, and artillery prime movers.

The MKT-L, MKT-T, and MKT-S weigh 60 to 70, 40 to 45, and 55 to 60 kilograms respectively. When the cover is wet, its weight is two to three times greater.

The set is usually erected by crew members, teams, and leaders. This requires 5 to 10 minutes.* Depending on the size of the object being camouflaged, the set can be used whole or in parts.

The MKT is used most often to set up large screens to camouflage equipment and installations. Troops also use the cover of the set to make overhead, vertical, and other screens.

Besides the regulation camouflage sets, the troops still have the regulation screens (model 1949) and camouflage nets issued in past years. The cover of such a screen is similar to the cover of the MKT-T set. The screen consists of several sections (6x6 or 3x6 meters) whose surfaces do not have the same density of camouflage material. When the screen is assembled, its sections are connected so that the greatest density of camouflage material is in the middle.

The *multi-purpose frameless "Shater" net* is designed to camouflage heavy combat equipment and special equipment. It consists of two camouflage covers (made of cotton or synthetic materials), each 12x18 meters, 18 stake units, and 6 stake heads (or stake caps). The set also includes anchor pegs, pickets, packing cases, and other parts. Each cover consists of 12 sections 3x6 meters in size. When assembling the screen, the camouflage covers are joined with a quick-release-pin seam (figure 4). The stake units are made of duraluminum tubing with a diameter of 58 millimeters. The supporting stakes, with a length of about 3, 4.5, and 6 meters, are made of this tubing.

The stake caps (diameter 50 centimeters) are made of wire. Each cap is fitted with two canvas straps for attaching the stakes to the cover.

The screen weighs 250 kilograms. It is set up in summer by a crew of five men in 15 to 20 minutes.

The regulation camouflage sets and screens are used many times and so must be protected against soiling. After use they are thoroughly dried and are stored away from rain and snow.

Radar Corner Reflectors

Radar corner reflectors are used to counteract enemy radar reconnaissance. The corner reflector is a device made of perpendicular surfaces that form three-sided corners. A reflector usually has four or eight corners; the

* Here and further on in the text, the time shown for setting up camouflage devices refers to daylight. At night, the time required is 1.2 to 2 times greater.

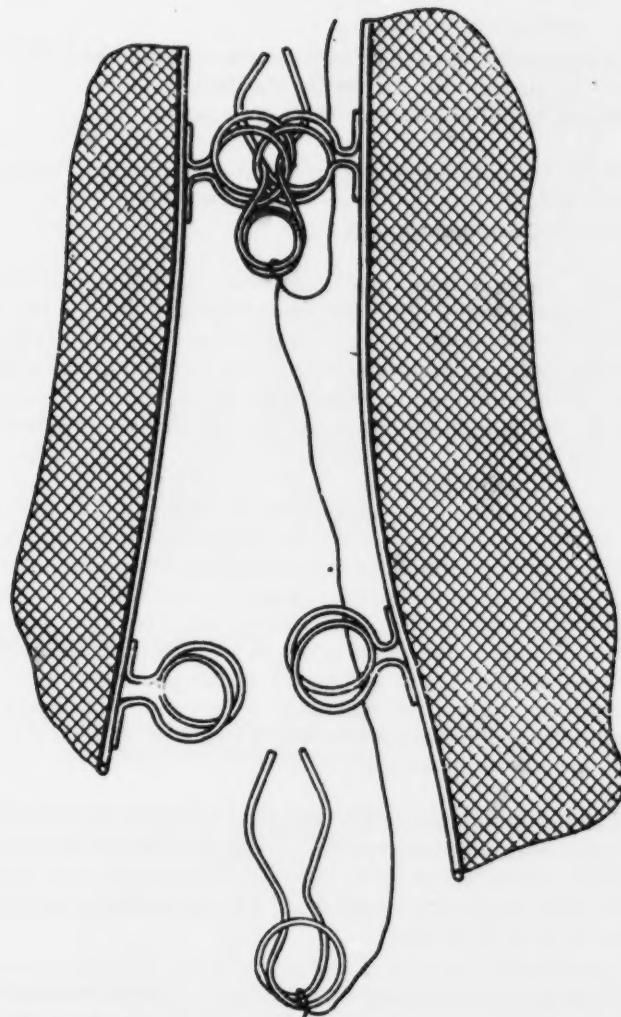


Figure 4. The "Shater" quick-release-pin seam.

sides of each corner can have the shape of a triangle, square, or quadrant. The reflectors are made of sheet metal or of some other material that reflects radio waves well. The reflector reflects the radio waves in the reverse direction of emission.

As a rule, industrially produced reflectors are used to carry out camouflage. The *metal corner reflector* (figure 5) issued to troops is used on land to create a radar jamming screen and to simulate equipment. When

the reflector is deployed, its sides are locked in place with spring catches welded to its surfaces.

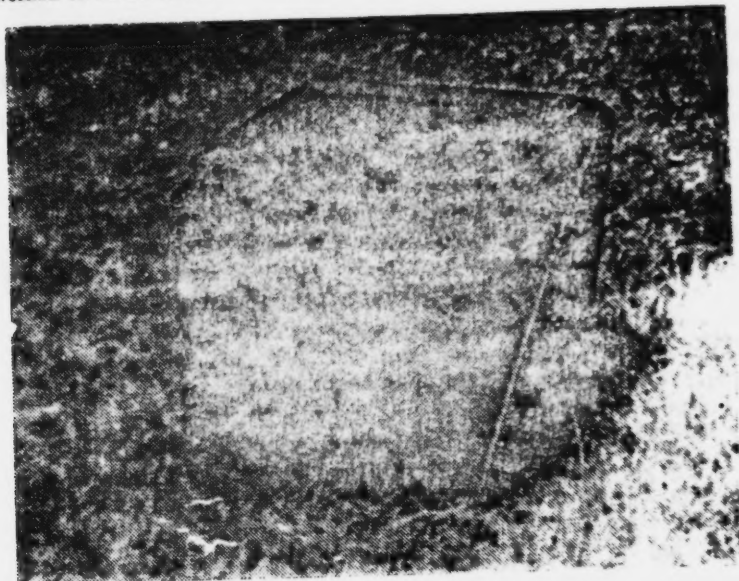


Figure 5. Metal corner reflector.

The reflector is suspended from a support of poles, beams, or other local materials by a nylon cord included in the set. The reflector is folded into a carton for transport and carried in a wooden crate. Reflectors and capron cords are put in the crate together.

The troops are also supplied with the "Pyramid" corner reflector. It is used to simulate and conceal bridges and to camouflage lakes, river bends, and other water reference points.

The troops themselves can make reflectors with wooden poles and sheet metal. Each corner reflector must be made so that the corners form right angles and the surfaces have no dents. When these requirements are not observed—for example, if there are dents even a few millimeters deep—the ability of the reflectors to reflect radio waves is sharply reduced. It is difficult to make high quality reflectors. Thus, reflectors are made only when extremely necessary. To reduce conspicuousness, reflectors are colored to match the surrounding terrain or water.

Equipment Mock-ups

Equipment mock-ups are designed to simulate tanks, armored personnel carriers, and other transport vehicles when false positions, subunit

dispositions, and other false objectives are created. They are also used to simulate troop movements.

These devices are made from drawings or from real models by subunits of the engineer troops. When needed, combat arms subunits are called on to make mock-ups. The mock-ups can be collapsible or stationary, and can be simple or detailed.

Collapsible mock-ups are made in advance. They are transported in knockdown form to the site where they are to be used, where they are assembled and set up. They consist of a frame and outer cover. The frame can be made of wooden laths (or poles and metal pipes) and wire (or cables and cords). The frame should be simple in design and easy to assemble. The frame, as a rule, consists of flat sections joined by flexible or rigid connections. Fabric, plywood, tar paper, sheet iron, cardboard, heavy paper, and thin boards are most often used for the outer cover.

When mass producing collapsible mock-ups, the work should be organized so that each group of soldiers makes only one part of the mock-up. The composition of the group depends on the amount of labor required to make the mock-up, and the number of groups is determined by the design of the mock-up. Such organization makes possible high productivity. Preparing a mock-up calls for 40 to 100 man-hours.

Collapsible mock-ups are transported by truck. One truck can carry 7 to 10 tank or truck mock-ups. The mock-ups are assembled under cover of woods or in other places not observable from the air by the enemy.

Mock-ups of entire vehicles are often not made beforehand; instead, mock-ups are made of just the most typical parts, for example, of a tank turret, truck cab, and so on. Other mock-up parts are made from local materials at the place where the mock-ups will be used.

When the mission is to simulate the march of a unit or subunit, towed or self-propelled mock-ups can be made. A frame of logs or beams can serve as the base of a towed mock-up. Self-propelled mock-ups of tanks, rocket launchers, and bridging equipment are usually mounted on trucks.

Stationary mock-ups are made at the site of their use from dirt or snow. To lessen the work, they are built, as a rule, in emplacements or shelters. The surfaces of mock-ups made of dirt are made realistic with clay (or cement, latex, and paint). Moss, leaves, and grass are added to the clay so that it will not crack during drying. Some parts of the stationary mock-ups can be made of wood and other local materials. Stationary mock-ups demand more time and effort to build than collapsible mock-

ups. They also have another disadvantage: their orientation to surrounding local objects remains constant.

For the enemy to take mock-ups for real equipment, they must not differ in shape, size, and appearance from the corresponding real equipment. Mock-ups are usually meant to mislead enemy air reconnaissance. Thus, those surfaces and parts of the mock-up seen from the air must be especially carefully made. All parts larger than 10 centimeters are reproduced. This is because they themselves or their shadows are recorded on large enemy aerial photographs. It is advisable to use paint to emphasize the glass of truck cabs and other flat parts with high contrast to vehicle surfaces. The greatest resemblance to real equipment is achieved when parts of destroyed equipment are used in making the mock-ups.

Mock-ups must be taken for real objects not only by optical reconnaissance but also by radar reconnaissance. This is possible only when two or three metal corner reflectors are placed inside a collapsible mock-up on an open site. When mock-ups are in emplacements or shelters, or in woods, bushes, or near local objects, this need not be done because combat or transport equipment similarly located is not detected by enemy radars.

Great similarity to real equipment is achieved when mock-ups are camouflaged. It is advisable to simulate camouflage with the cover of an MKT-T set that has been faded by the sun or that is slightly filled with camouflage material (so that the mock-up will be seen through the cover). Local camouflage materials and nets can also be used. Well-made mock-up parts are not camouflaged.

Tracks are laid to the mock-ups with tanks, armored personnel carriers, and so on.

Skillfully and carefully prepared mock-ups of tanks, guns, and vehicles (figure 6) can not be distinguished from combat equipment with the naked eye at 200 to 300 meters.

Simple mock-ups that reproduce camouflaged equipment can be used along with those prepared in great detail. For simple mock-ups, a frame is built of beams, poles, and other local materials covered with the regulation camouflage cover. Only those parts not covered by screening are carefully made. Covers that are faded or that differ from the background are used so that the enemy will detect the "camouflaged" equipment.

Equipment mock-ups were widely used by our troops in the Great Patriotic War. For example, in December 1944, 400 tank mock-ups, 500



Figure 6. Tank mock-up made of earth.

truck mock-ups, and 1,000 gun mock-ups were made and installed south of the Sandomierz bridgehead to create false tank unit concentration areas.

Paints and Painting Equipment

Paints or paint mixtures and painting equipment are used in camouflage painting of equipment and installations and also in making mock-ups. The paints consist of a pigment (dry mineral coloring) and a binder. The pigments (finely ground colored powders) give the paint mixture the specified color. They may be natural (ocher, umber, chalk, and so on) or artificial (white lead, chromic oxide, and so on). Binders are substances that bind particles of pigment together and hold them on a painted surface.

Usually, oil, oil-lacquer (enamel), emulsion (latex), paste, and lime paints are used. Industry produces ready-made paints in all colors that are used for camouflage. Table 2 gives the paints most frequently used.

Oil paints are made as thick pastes or ready-to-use paints packed in wooden barrels or tin cans. Before using, the paste is dissolved in drying oil or drying oil mixed with turpentine, or in solvent, turpentine, or lacquer solvent (white spirit). Ready-made oil paints are not dissolved in oil or other solvents.

Oil paints can be used to paint metal, wood, cardboard, and cement surfaces. At an air temperature of 18 to 20 °C in dry weather, they will dry in not more than 24 hours.

Table 2. Colors and types of some paints used in camouflage.

Color	Oil	Enamel	Dry mineral
Green	4BO primer, MA-15 green	Nitro enamel ZIL-508M	Chromic oxide
Black	MA-011	KhV-714 black	Carbon black (flame, lamp, gas)
Sand	7K sand, ocher	PKhV-6	Ocher
Red-brown	Iron-red lead	PKhV-26	Iron-red lead
Brown	6K dark brown, Prussian red	KhV-113 brown	Umber, Prussian red
White	White zinc	KhV-1, PKhV-101	Chalk, slaked lime

Enamel paints (or enamels) are industrially prepared ready-made paint mixtures. Enamels are distinguished by their high luster. To prevent thickening, they are diluted with lacquer solvent, turpentine, or other solvents. The solvents are flammable.

One variety of enamel paints is the volatile resin paints, which include the perchlorovinyl enamels PKhV, KhV, and KhSE and the nitro enamels. When necessary, they are mixed with special solvents. Drying time for the enamels is 0.5 to 72 hours.

Emulsion (latex) paints are divided into water soluble polyvinylacetate paints type VA and acrylic paints. Synthetic resins serve as binders. Paint VA-17 may be white, brown, or other colors. Drying time for these paints at an air temperature of 18 to 20°C is 2 hours. They are diluted with water to achieve working viscosity. After drying, these paints do not wash off with water.

The *paste paints* consists of a pigment, paste, and water. If ready-made paste paints are not available, the troops themselves can prepare them in the field. For yellow (sand) pigment, ocher can be used; for green, chromic oxide; for brown, iron oxide and umber; for black, carbon black and pyrolusite; and for white, chalk and slaked lime.

The paste paints also include casein paints, which are colored powders in which casein is the binder. Casein paints are dissolved in water before use (1 liter of water for 1 kilogram of paint). The water is poured into the paint gradually. The paint mixed with water is held for 1 hour, and is then run through a 1,600 mesh per square centimeter sieve. The paint can be used for 2 days. Casein paints are used to paint cement surfaces.

Lime paints are prepared at the work site from lime, pigments, and common salt. They are used to paint cement, brick, and wooden surfaces.

As mentioned, the pigments are held to the painted surfaces with *binders*.

The troops most frequently use paste (prepared from joiner's glue, house painter's glue, or casein glue), oil, emulsion, and lime binders.

Joiner's glue (bone glue) and house painter's glue (hide glue) are prepared industrially in yellow or dark brown slabs 80x150 (100x200) millimeters and 10 to 16 millimeters thick. These glues are used to paint metal, wood, fabric, cardboard, and cement surfaces.

Casein glue is a white, yellow, or brown powder.

Paints made on a base of joiner's, house painter's, or casein glue wash off with water. It is advisable to use a flat oil or emulsion binder to obtain more stable paints.

Three liters of drying oil, 5 liters of turpentine, and 4 liters of drying agent must be mixed to make one bucket (12 liters) of flat oil binder. It takes one part pigment for two parts by weight of binder to make a paint mixture.

Emulsion binder is a mixture of kerosene, drying oil, casein glue, and water.

Table 3 gives methods of preparing binders.

Table 3. Methods of preparing binders.

Binder	Necessary materials	Methods of preparation	Remarks
Glue	Joiner's (house painter's) glue, 1 part by weight; water, 20 (30) parts by weight	Pour warm water on finely broken pieces of glue; heat on slow fire 10-12 hours without scorching	1. Add paint to the cooled binder 2. Use twice as much binder as paint
Glue	Casein glue, 1 part by weight; water, 7 parts by weight	Dissolve glue in 3 parts by weight of water; after 30 minutes, pour remaining water into solution	The binder can be used for 6 hours after preparation
Lime	For 1 bucket: slaked lime, 3 kilograms; common salt, 0.1 kilogram; water, 6 liters	Dilute lime paste in 5 liters of water; to this mixture add the salt dissolved in 1 liter of boiling water; dilute with remaining water	1. Add no more than 300 grams of paint to the composition 2. The binder is suitable for painting all surfaces except metal and fabric
Emulsion	Kerosene, 1 part by weight; drying oil, 2 parts by weight; casein glue, 5 parts by weight; water, 32 parts by weight	Mix glue in 24 parts by weight of water and heat 2-3 hours; mix kerosene with drying oil in separate vessel, pour into the cooled glue solution, mix; pour remaining water into emulsion	The binder can be used for 2 days

Painting 1 square meter of surface usually calls for 150 to 250 grams of ready-to-use oil, enamel, sizing, or lime paint.

Containers, buckets, cans, measures, scoops, metal sieves, brushes (or paint spreaders), and protective glasses are used in painting. Paints are prepared in containers and buckets. Cans (usually 1 liter), measures, and scoops are for measuring the dry paints and liquids, sieves (at least 250 mesh of 3 millimeters diameter per square centimeter) are for sifting the dry paints, and brushes (or paint spreaders) are for applying the paints to the surfaces to be painted.

Solvents are used to wash the hands, vessels, brushes, and paint spreaders and also to dilute thickened oil and enamel paints. Table 4 gives information about the solvents.

Table 4. Name and application of solvents.

Name	Color	Application
Acetone	Colorless transparent	Diluting nitro paints, removing grease from surface before painting
Butyl acetate	Colorless	Diluting nitro paints and enamels
Butyl alcohol	Colorless	Diluting nitro paints
Kerosene	Colorless or slightly yellow	Diluting oil paints; washing hands, vessels, brushes, paint spreaders
Lacquer benzine (white spirit)	Colorless transparent	Diluting oil and enamel paints, washing vessels and brushes
Drying oil	Light yellow to dark brown	Diluting thickened oil paints
RDV thinners 646, 648	Colorless or slightly yellow	Diluting nitro enamels and nitro lacquers
R-4 solvent	Colorless	Diluting perchlorovinyl enamels and lacquers
Turpentine	Colorless or yellowish	Diluting oil and enamel paints
Toluene	Colorless	Diluting perchlorovinyl enamels

Blackout Devices for Trucks and Tracked Vehicles

Blackout equipment for trucks and tractors includes blackout devices for headlights, signal lights, and dome lights, the underbody light for trucks, and the side screen with electric lighting for tracked equipment. Blackout devices reduce the intensity of the light from vehicle lighting equipment. Because of this, the visibility of vehicle headlights is reduced several times.

The blackout device for headlights (figure 7) consists of two attachments on the headlights and a blackout switch. The attachments are mounted on the headlights in place of the diffusers. The blackout switch

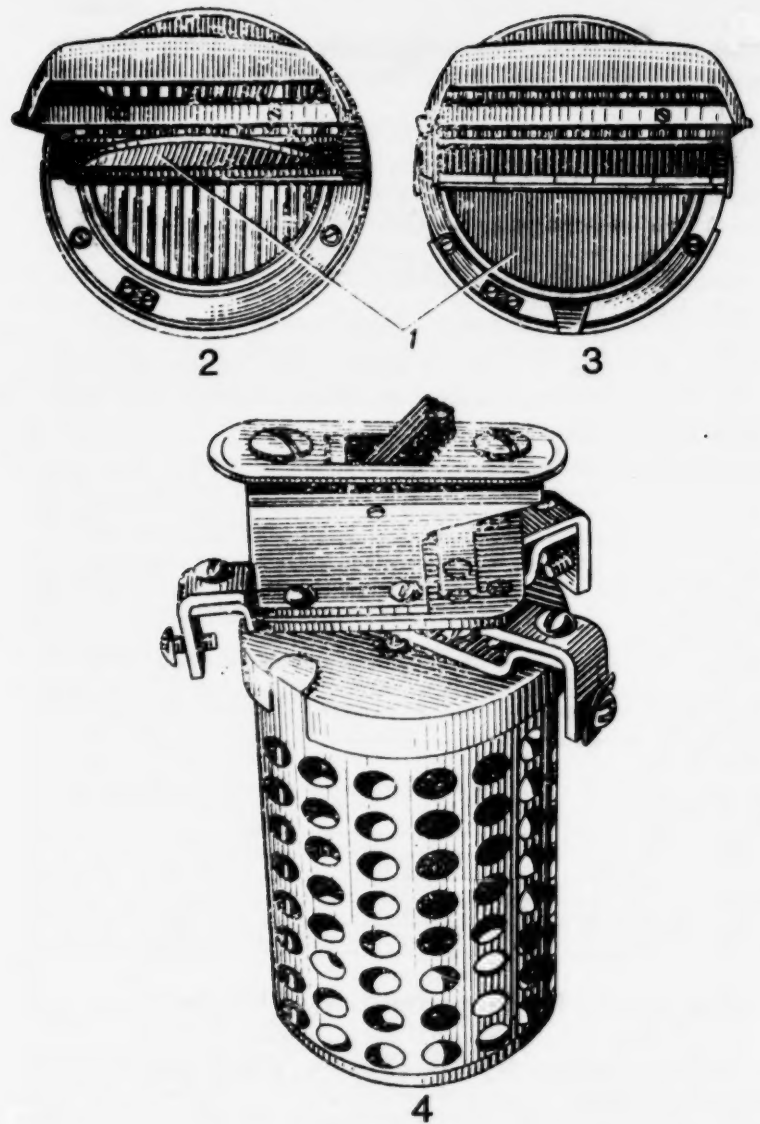


Figure 7. Blackout devices.

1. Cover
2. Blackout attachment (cover raised, undimmed)
3. Blackout attachment (cover lowered, partly or fully dimmed)
4. Blackout switch

is an electric resistor to reduce the intensity of the headlight. With the blackout device, three blackout modes can be created: undimmed, partly dimmed, and fully dimmed. Undimmed, the headlights are as bright as regular vehicle headlights. Under full dimming, the intensity of the headlights is sharply reduced and the amount of light on the road is cut down several times. Under partial dimming, the light is decreased less.

The blackout devices for signal lights and dome lights, as a rule, consist of metal inserts with holes. They are mounted inside the signal light (or dome light) between the bulb and the lens. The taillight of wheeled vehicles is concealed with a special rim with a cover and blackout insert. The insert is designed so that under way the driver can approximately determine the distance to the vehicle ahead.

The underbody light is installed on the truck (or trailer) to create a light beneath it so that, during travel in a column, the driver in the vehicle behind can find his way (the light is visible at approximately 30 meters).

The side screen with electric lighting, attached to the left portion on the rear of tracked vehicles, has the same purpose and is seen at the same distance as the underbody light for trucks. It consists of a screen and an illuminator. The screen (150 × 150 millimeters) is made of sheet steel painted white and is illuminated from above by a box-shaped illuminator.

Smoke Screening Devices

Ground forces subunits usually use smoke hand grenades, smoke pots, and artillery smoke shells for smoke screening. Smoke screening equipment and smoke generators can also be used to camouflage important objectives. If industrially produced equipment is not available, then local smoke materials are used.

- The *smoke hand grenades* RDG-2, RDG-2kh, and RDG-2ch weigh from 0.5 to 0.6 of a kilogram, burn about 15 seconds, and create a smoke screen 25 to 35 meters long in 1 to 1.5 minutes. The RDG-2 and RDG-2kh produce a white smoke, while the RDG-2ch produces black. The RDG-2ch can be used not only for setting up a smoke screen but also for simulating burning tanks and other vehicles during enemy strikes on false troop dispositions.

The smoke hand grenades are easy to transport and simple to handle. They are thus widely used by subunits of all branches of troops.

Smoke pots are divided into small, medium, and large.

When smoke pots burn, a smoke is given off that is harmless to humans (white with a yellowish tinge or yellowish brown changing to white smoke further away from the pots). The small DM-11 and DMKh-5 smoke pots consist of a cylindrical tin case (filled with smoke mixture), a diaphragm, and a cover with a handle. The diaphragm of the DM-11 pot (figure 8) has 11 openings for the smoke. While the pots are in storage, the spot where the cover joins the case is wrapped with insulating tape and the openings in the diaphragm are covered with foil.

The pots are activated by the detonator. The detonator is put in the pot before it is set off.

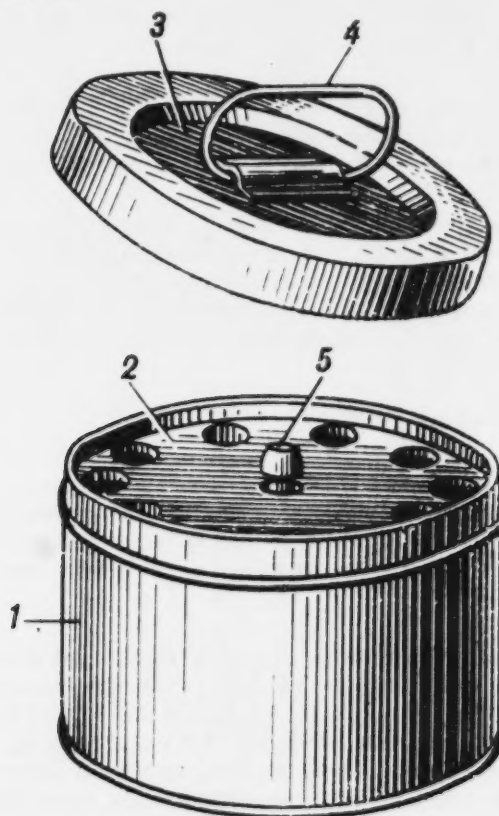


Figure 8. DM-11 small smoke pot.

1. Case
2. Diaphragm
3. Cover
4. Handle
5. Detonator

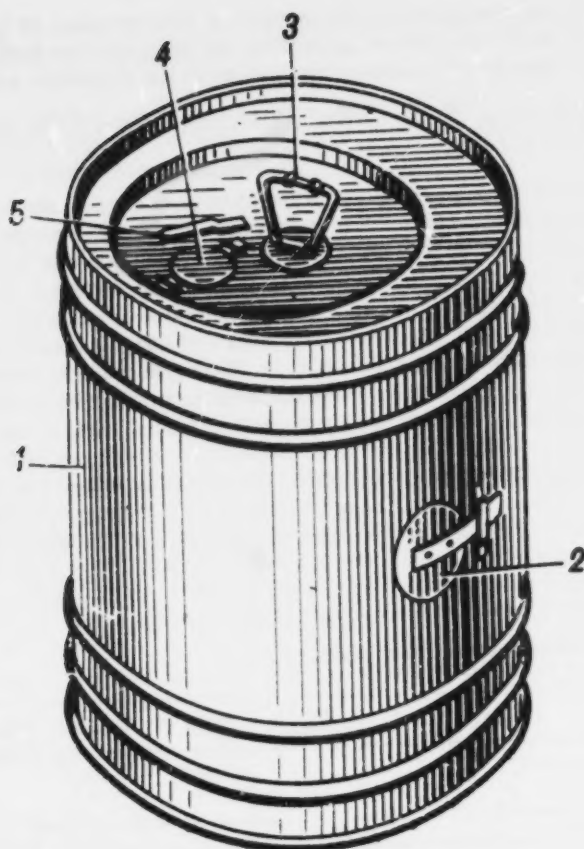


Figure 9. BDSH-5 large smoke pot.

1. Case
2. Valve for smoke escape opening
3. Handle
4. Cover for detonator tube
5. Striker mechanism for setting off percussion action detonator

The following sequence is advisable when setting off a smoke pot: the insulating tape is removed and the cover is taken off;* the foil over the openings in the diaphragm is pierced with a sharp object; the detonator is set in the central opening down to the stop and set off.

Rubbing a match box (or friction igniter) on the head of the detonator

* If, because of rust, the cover can not be removed, openings are made in it for the igniter and for the escape of smoke.

lights it and ignites the smoke mixture. If the detonator, or the smoke mixture, in the pot fails to ignite (after the detonator has been lighted), another detonator is placed in any opening in the diaphragm and set off.

Small smoke pots are carried in cloth packs (8 in each); the detonators are carried in boxes.

The BDSH-5 (figure 9) and BDSH-15 large smoke pots are designed to create large smoke screens. They are buoyant. Their smoke escape openings are always in the upper position. The large smoke pots can be activated with an electric detonator or a percussion-action detonator in this sequence: a pot is put on the ground with the smoke openings up; the valve is opened and the foil over the smoke escape openings is broken; the cover is removed from the detonator tube; an electric detonator is connected to an electric circuit. If the pot is activated mechanically, then the stopper is unscrewed from the detonator tube with a special wrench, the electric detonator is withdrawn, and in its place is installed a percussion-action detonator with the primer uppermost; the stopper is screwed into its recess and a percussion-action firing mechanism is set in the stopper's opening; a current is switched on or the striker mechanism is struck with a hammer, stick, or stone.

Table 5 shows the basic specifications of smoke pots.

Table 5. Basic specifications of smoke pots.

Indices	DM-11 (DMKh-5)	DSKh-15	BDSH-5	BDSH-15
Size, centimeters: height diameter	11.5 16	34.5 16	48 41.2	48 41.2
Mass, kilograms	2.3-2.7	7-7.5	45-50	45-50
Duration of smoke formation, minutes	5-7	15	5-7	15
Length of impenetrable smoke in average weather, meters	50-70	50-70	200	115
Width of cloud at end of smoke screen, meters	15	15	40	30
Number of pots carried on a ZIL-131 truck	1,200	600	80	80

Note: The pots do not burn for more than 30 seconds.

Artillery and mortar smoke shells differ from high explosive fragmentation shells only in that their casings are loaded not with explosives but with a smoke-generating substance. A cloud of white smoke forms 1 to 3 seconds after a smoke shell (or mortar round) is exploded. Depending on the caliber of the shell, this cloud lasts for 10 to 30 seconds.

Smoke screens can be created suddenly in an enemy disposition with artillery or mortar smoke shells. Fire is provided by regular guns or

mortars. To set smoke screens with this method requires a great number of smoke shells or mortar rounds.

Local smoke materials include pine branches, dry leaves of birch and alder trees, damp straw or hay, grass, rags, fuel oil, lubricants, and so on, burned in special fire pits.

Materials and Articles Used to Make Screens and Mock-ups

Troops use timber and finished lumber, metal articles, rope, and cord to make the frameworks for screens and mock-ups. Poles, roof beams, and logs are usually cut 4 to 6 meters in length. One man-hour is needed to prepare 10 poles 8 to 10 centimeters in diameter.

Steel pipes can be used to make the posts for overhead and vertical screens and also for the more heavily loaded parts of equipment mock-ups.

Stays, guy wires, and other tension parts of the frameworks of screens and mock-ups are made from cable and wire. The cables and other flexible parts of frameworks can be attached to poles, beams, and logs with wire shackles.

Nylon, flax, and cotton cords are good because of their great elasticity.

Local Camouflage Materials

Troop units use turf, tree sections, grass, dirt, snow, and other local materials to conceal equipment, installations, and other military objectives.

Turf is used to camouflage breastworks and the earth around fortifications in an open field. It is most frequently prepared by hand in individual sections (20x40 centimeters, 8 to 10 centimeters thick) or in strips (up to 2.5 meters long and 25 centimeters wide).

It is advisable to take the turf in places similar in soil composition, moisture, and relief to the camouflaged sites so that the turf will thrive best at the new site and work well as camouflage.

It is not desirable to use turf with high grass because the grass quickly withers.

When storing, transporting, or carrying turf to the site for use, the grassy sides of the sections are laid against one another. At sites where the

turf is to be laid, the soil is leveled and the sections are laid tightly against one another.

Turfing installations is usually done by detachments, crews, and teams. To finish the work faster, it is desirable to set up groups to prepare the turf (2 men), to carry or transport it to the site (2 to 4 men), and to lay it out (2 men).

Turfing is laborious work requiring much time. On the other hand, turfing provides excellent camouflage, which is seen immediately after the turf is applied.

For camouflage of shelters at control posts in the defense and at other important installations, the surfaces to be covered with turf are broken up and spread with plant soil (in a layer 1 to 2 centimeters deep). It is desirable to water the new turf, especially in dry weather, in 2 or 3 days.

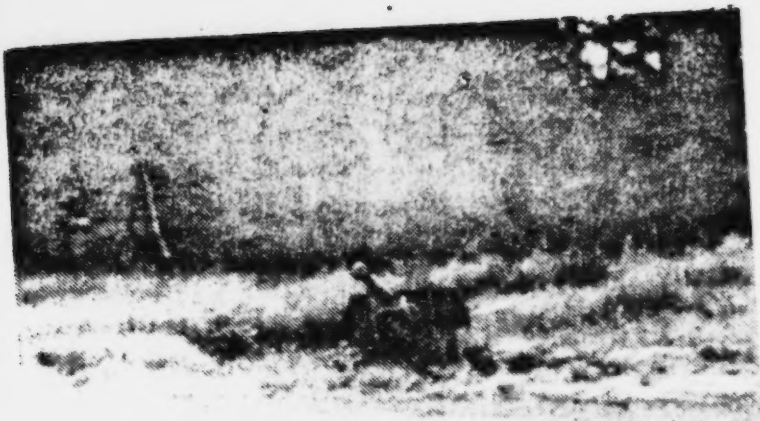
Tree sections and bushes are used widely and effectively to camouflage equipment and installations. Maple, oak, birch, linden, ash, and poplar branches stay green no more than 2 days in summer, and the leaves on aspen, acacia, and hazelnut branches curl up and turn black in a few hours. Pine and fir branches last 10 to 12 days in summer and up to 80 days in winter.

It is advisable to take branches from trees growing at the edge of a forest and also in dry sandy and loamy soils. For camouflage, large branches (0.7 to 1 meter and more in diameter) are preferable. They wither more slowly. It is advisable to keep the cut growth in the shade before use.

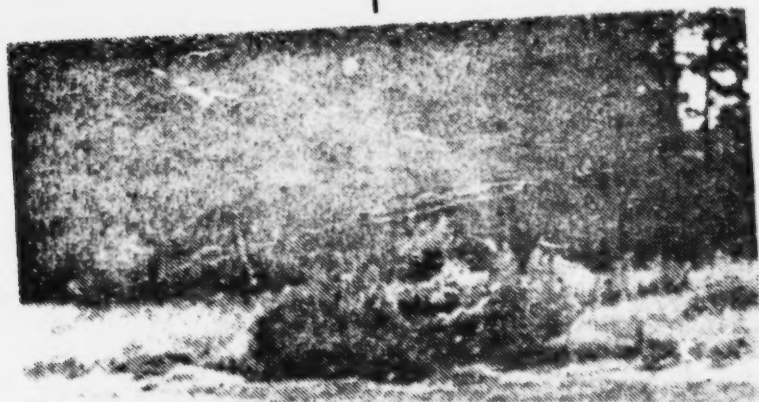
Cut tree growth can be used to build simple disruptive screens when camouflaging combat and transport equipment. Branches are placed vertically and supported with brackets, lengths of pipe, loops of wire or fabric tape, and other devices attached to vehicle surfaces. Vehicles concealed with cut tree growth in parking areas or positions blend well with the terrain. In figure 10, for example, it is clear that the camouflaged gun can not be distinguished from the group of bushes.

Moss and various grasses are used to match overall screens to the terrain and also to conceal combat, special, and transport vehicles, installations, and other objects.

Mats of straw, cornstalks, reeds, thin brushwood, and tall grass can be made for use as screen covers. Bundles of stalks are fastened together one against another with thin wire or cord. Straw, reed, and brushwood mats can be coated with a clay solution. This makes them fireproof against napalm or the thermal radiation of a nuclear burst.



1



2

Figure 10. Gun concealed by disruptive screen made of cut branches.

1. Before camouflaging
2. After camouflaging

In the winter, snow can be used to match overall screens to the terrain, to cover tracks, to conceal dirt thrown aside, and to make trench screens and mock-ups.

Chapter 4. Camouflage Methods

Ground troop units use terrain camouflage properties and limited visibility to conceal their disposition, intentions, and operations. Various engineer and technical camouflage methods are also widely used: camouflage painting, artificial screens, deceptive contours, terrain camouflage, false installations, blackout devices, and smoke screens. We will discuss each of these methods in more detail.

Use of Terrain Camouflage Properties and Limited Visibility

Using terrain camouflage properties and limited visibility skillfully makes possible the concealment of subunits and the execution of combat missions with little or no expenditure of men, equipment, and time on camouflage. Thus, natural conditions are used by troops first and in all types of combat operations. The maximum use of natural conditions is now quite important.

Terrain camouflage properties are determined by the number and quality of natural screens and spotted areas. Forests, groves, bushes, and populated areas are natural screens against air and ground reconnaissance. Terrain is divided according to the number of natural screens into closed, semi-closed, and open.

Large forests are the best natural screens (figure 11). The main index of the concealment properties of a forest against air reconnaissance by the enemy is the density of the tree crowns (C_k)—the ratio of the crowns' area of projection to the entire area of a given sector of forest. A dense forest has a great density of crowns while a sparse one has a low density. If C_k is greater than 0.5, then the ground in the forest can not be seen during visual reconnaissance and aerial photography.

When camouflaging subunits, dense forests are used first of all, especially forests with an undergrowth that hinders not only air but also ground observation—subunits can be seen on the ground at no more than 100 meters. Coniferous forests keep their camouflage properties year round, deciduous forests only in spring and summer. If a subunit concentration area is selected in a forest, then combat and transport vehicles, slit trenches for personnel, and shelters and emplacements for equipment are spread out along roads and gaps under dense tree crowns in



Figure 11. Aerial photo of a forest.

places that the enemy can not see from the air. If a fire breaks out, such a disposition permits the subunits to leave the danger area quickly.

For troop movements, roads and gaps covered by tree crowns should be used. When a cross-country track must be laid out, the route is selected under the densest crowns with the most branches. Only those trees and big branches that interfere with movement are cut.

Objects to be camouflaged can also be placed on northern edges of forests and groves that are shaded much of the time.

Bushes provide good concealment, especially when they are of different types and of uneven height.

Small and large villages and towns and other populated areas also create favorable conditions for camouflage, including from radar and

thermal reconnaissance. Buildings, garden plots, parks, orchards, other cultivated sections, roads, and paths in a populated area form a spotted contrasting background against which personnel, equipment, and installations are difficult to detect. Shadows from local objects in sunny weather further increase the mix of background colors (figure 12).

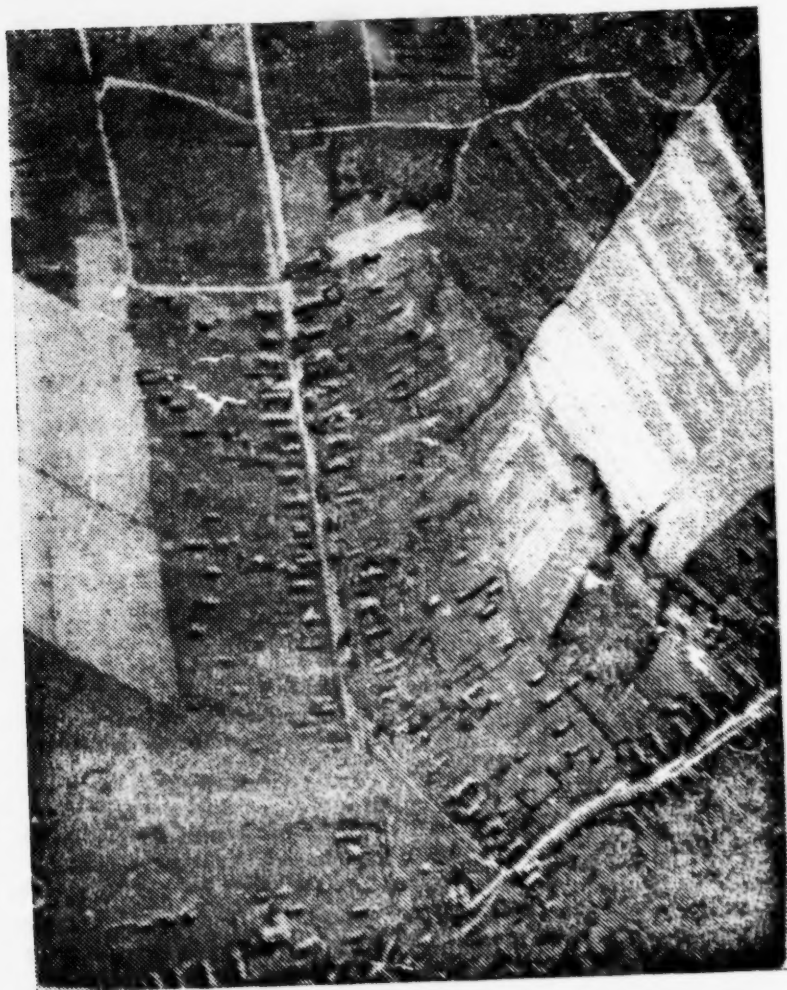


Figure 12. Aerial photo of a populated area.

Combat vehicles and motor transport are concealed in sheds, under awnings, in ruins, in gardens, in the shadows of local objects, and behind fences. If the equipment is in a populated area for a short time, it can be placed near buildings and covered with local camouflage materials.

On open terrain, it is advisable to select spotted areas to reduce the conspicuousness of equipment and installations during optical air reconnaissance. Vehicles painted protective green are placed on dark ground. Fieldworks, which usually stand out because of the light color of breastworks and the earth around them, are placed on patches of barren soil. In winter and spring, if the snow cover is not dense, vehicles not painted protective white are placed on patches of thawed ground.

Besides forests, bushes, and populated areas, the reverse slopes of hills, as well as ravines, embankments, fences, and other local objects, can be used for concealment against ground reconnaissance. During observation from ground posts with optical or radar reconnaissance equipment, dead grounds formed behind local objects and in ravines and gullies permit concealed movement, the laying of roads, and the conduct of other missions.

Dead ground can be determined from a large-scale topographical map. To do this, lines of sight are drawn from the assumed site of the enemy observation post through the crests of ridges, populated areas, and other obstacles to observation. Along each line a profile of the terrain is made and the limits of the optical dead grounds are determined. These limits are transferred from the profiles to the map.

The rear limit of the radar dead ground is determined by reducing the depth of the optical dead ground by 25 percent.

Personnel and equipment must not be situated on topographic crests or in other places where they can be observed by the enemy against the sky (figure 13).

Natural screens were widely used in the Great Patriotic War to conceal troops and objectives. Let us give one example.

To deliver to besieged Leningrad cargo transported from September through November 1941 across Lake Ladoga, a pier had to be built on the lake's west shore. The site selected was near the populated area Osinovets. Dumps, approach routes to the pier, and other objectives were laid out in dense forests. Natural screens made it possible to safely conceal not only stationary objects but also the movement of people, vehicles, and shunting engines.



Figure 13. Soldiers silhouetted against the sky.

Opportunities for optical reconnaissance are also reduced when local objects and their shadows are used. Vehicles must be positioned so that their shadows are concealed or distorted by local objects.

Local objects also aid in camouflaging equipment from radar detection. A tank, armored personnel carrier, truck, or other movable object near a local object (at a distance not exceeding the lowest resolution capability of the radar) is not detected because its blip on the radar screen runs together with the blip of the local object. It must be remembered, however, that using free-standing objects for camouflage is inadvisable because they may make good reference points for the enemy.

Limited visibility—darkness, fog, low dense cloud cover, and precipitation—makes reconnaissance by visual observation, photography, and television more difficult.

Fog reduces the range of visibility both day and night. For example, when the air is clear, a headlight can be seen at night from 15 to 20 kilometers. The distance is cut to 1.5 kilometers in light fog, and to 0.2 of a kilometer in dense fog. Dense fog can not be penetrated by visible and near infrared rays; night vision devices thus can not be used in dense fog.

Optical air reconnaissance also can not be conducted when there is low dense cloud cover. Like dense fog, clouds of water vapor and water droplets can not be penetrated by infrared radiation.

Rain, snowfall, and other precipitation hinder not only visual and optical reconnaissance but also radar reconnaissance. Thus, if radar can detect an

object at a certain distance in good weather, then this distance is reduced in moderate and heavy rain. It is especially important to use poor visibility in operations on open terrain. In the Great Patriotic War limited visibility helped to conceal troop movements, replacements, and other operations.

Limited visibility can also be used to conceal the operations of subunits, especially during reconnaissance by fighting patrols, during troop movements, and during the execution of various engineer support missions. It must be remembered, however, that at night and at other times when visibility is limited, the enemy will conduct reconnaissance with night vision devices, radar, and thermal direction finders, and will also illuminate the terrain to make photography possible. Limited visibility thus must be supplemented with artificial screens, camouflage paint, smoke screens, other engineer and technical methods, and blackouts.

A commander, to make more effective use of natural conditions to camouflage the operations of his troops, must be able to evaluate these conditions. He must know the terrain camouflage properties and other conditions before executing the assigned mission. Terrain camouflage properties can be learned from topographical maps with a scale of 1:25,000 to 1:100,000, from aerial photos, by reconnaissance and interrogation of local inhabitants, and by other means.

When studying a forest, grove, or group of bushes, the area covered by the screen is determined, as are the types of trees, the height of the trees, the denseness of the forest (and the denseness of the tree crowns), and the presence of undergrowth. Approaches to the screen are studied, as are roads, gaps, and water sources within the limits of the designated area.

An evaluation of a populated area takes into consideration the number of houses and other buildings, the existence of below-ground structures, the types of buildings, and the existence and condition of gardens, fences, and other local objects.

An evaluation of the terrain camouflage properties makes a conclusion on the possibility of concealed operations or of concealed disposition of a subunit, on the presence of local camouflage materials in the given area, and on the need to use engineer and technical concealment methods.

When evaluating the natural conditions, the number of hours of darkness each day is determined, and the type and duration of fog, the frequency of overcast days, and other phenomena that make visibility difficult are studied.

Camouflage Painting

Camouflage painting is used to make tanks, armored personnel carriers, trucks, and special vehicles less noticeable to enemy optical

reconnaissance. Protective or dazzle paint is used for mobile objects, while protective or imitative paint is used for stationary objects. Painting is also used to make mock-ups and other false structures look real.

Protective paint consists of a single color that is the least noticeable against a given background. Combat equipment, weapons, and motor transport come out of the factory, as a rule, painted a protective dark green. When the snow falls, combat and transport vehicles, steel helmets, and weapons are painted a protective white by the troops. In desert areas, equipment must be grayish yellow. The protective paint is applied over the factory paint.

Dazzle paint for the snowless periods of the year usually consists of large spots in three colors—green, dark brown (or black), and sandy earth. At times, dazzle paint may be of two or four colors.

Dazzle paint makes detection and recognition of an object more difficult because the individual spots of color merge with the terrain background and the visible shape of the painted object is distorted. For example, if a vehicle painted in summer dazzle color is in the shadow of local objects, on black earth, or on other dark patches, the dark brown (or black) spots of color will merge with the background and “drop out” and the shape to which the eye is accustomed will be distorted. The same thing happens with spots the color of sandy earth if a vehicle is against a yellow background. Dazzle paint simplifies the camouflaging of equipment with local means.

Summer three-color paint for an infantry combat vehicle is applied so that the green color covers about 50 percent of the vehicle; the remaining colors each cover 25 percent. With the arrival of autumn, 30 to 50 percent of the green is repainted in a yellow characteristic of autumn foliage. The spots of color are curvilinear and are varied in outline and size. Their diameter may vary from 0.5 to 1.5 meters. Spots of elongated shape are applied to the outline of the vehicle at an angle of 30 to 60°. They must extend from one section of color on the object to another. Projecting angles should be painted a dark color.

Winter dazzle paint is used when vehicles operate where there are forests, bushes, populated areas, and thawed earth. The paint is usually of two colors: white, which covers up to 75 percent of the surface, and dark green (or dark brown). Winter dazzle paint sharply reduces the range at which an object is visible.

Imitative paint is multicolor paint that reproduces on an object a color picture of the surrounding terrain or which makes the object appear destroyed.

Several colors are used for imitative painting. The spots of paint must match the color of the surrounding terrain. This camouflage method can be used to conceal tents, barracks, and reinforced concrete or armored installations for observation and fire. It can also be used when camouflaging low bridges, buildings, and other installations to make them appear destroyed.

In the Great Patriotic War, tanks, guns, trucks, and large stationary objects were painted.

Use of Artificial Screens

One of the most widely used engineer and technical camouflage methods is the construction of screens from regulation devices and local materials. The screens are divided into antioptical reconnaissance and antiradar reconnaissance.

Antioptical reconnaissance screens are divided, according to form, into overall screens, vertical, overhead, and disruptive screens, and screen mock-ups.

Overall screens are those whose cover reaches the ground on all sides. They consist of a frame and cover, or of only a cover, and are used for concealment against air and ground reconnaissance. They may be used to camouflage individual trenches and communications trenches; shelters for personnel; shelters and emplacements for equipment; combat and transport vehicles outside of emplacements or shelters; dead-end roads; ravines; and bridges over rivers covered with ice or over dry beds. Overall screens can be flat, convex, or concave. Depending on the object to be camouflaged and on the surrounding background, they may have the form of a sector of terrain, a hill, embankment, or group of bushes or rocks. Overall screens are most frequently made from regulation camouflage sets. It is also possible to use tarps, tar paper, and mats of straw, reeds, or brushwood in flat overall screens.

Overall screens consisting of a camouflage cover over posts that are usually made of local materials and fitted with wire figure eights are used to camouflage tanks, guns, infantry combat vehicles, rocket launchers, and trucks in open dispositions (figure 14).

Overall screens are built by crews, teams, and drivers of trucks or armored personnel carriers. In camouflaging a tank, gun, or other piece of equipment with a regulation camouflage set, the team or crew does the following: takes the cover from its case, unfolds it on the ground, carries it to the object to be camouflaged, and places it so that the quick-release

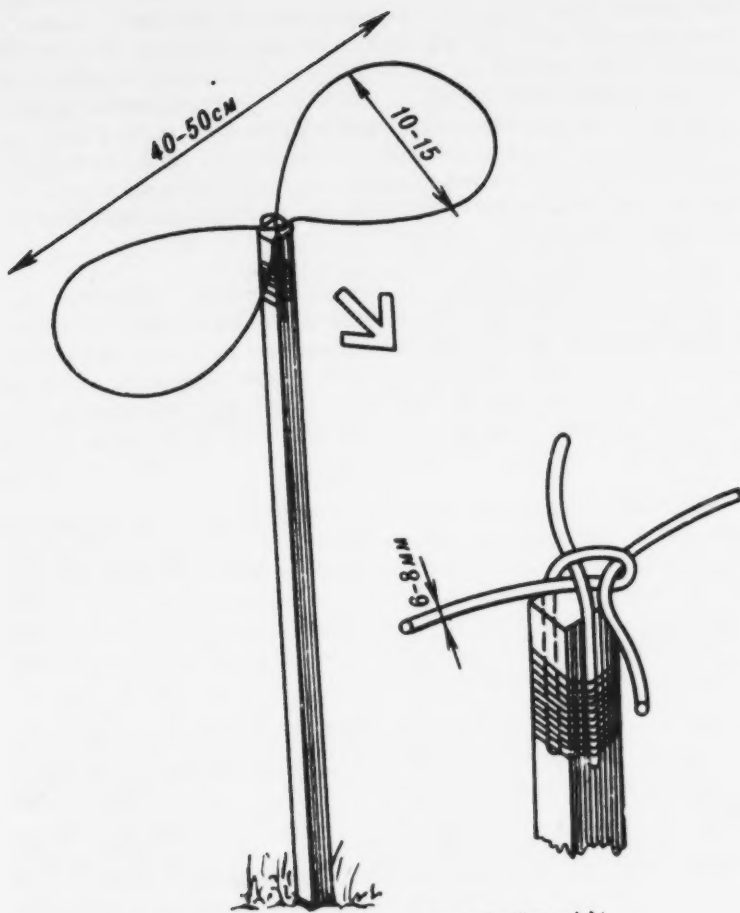


Figure 14. Fitting a post for an overall screen with a wire figure eight.

seam is in the main direction of fire; stakes the cover to the ground, tightening it well and turning the corners so that a rectangular shape is not formed (when a screen is set up in the snow or on shifting sand, the edges of the cover are made fast with snow or sand instead of pickets); places the posts under the cover so that they do not interfere with the conduct of fire and work under the screen and so that the cover is 30 to 40 centimeters above the equipment; loosens part of the quick-release seam and places the cover no less than 50 centimeters from the muzzle end of the weapon; throws grass, small branches, snow, or other local camouflage material on the cover so that it will blend in with the surrounding terrain in color and outline; camouflages the tracks made when setting up the screen.

When camouflaging a rocket launcher with the "Shater" screen, the crew spreads both covers on the ground near the installation, connects them with a pin seam, and rolls up each of them toward the seam; carries the cover to the launcher and places it so that the pin seam coincides with the longitudinal axis of the vehicle; unrolls the cover and secures its edges to the ground just as when camouflaging a tank or gun; working under the screen, collects the posts and fastens the stake caps to the end or diagonal stretchers of parts of the cover; installs the posts, lifting the cover to do this, and slants them to ensure that both halves of the screen will fall to the side when the pin seam is opened.

Alternate emplacements for combat equipment, and shelters for trucks and special vehicles, can be camouflaged with overall screens made of local materials if regulation camouflage sets are lacking or in short supply. A frame can be made of wire, cables, and poles on which brushwood or straw mats and tar paper are placed. Depending on the surrounding terrain, grass, dirt, snow, or other local materials are thrown on the cover.

The need to distort the regular rectangular shape of the camouflage cover and to use local camouflage materials in building overall screens must again be emphasized. Distorting the shape of the cover is achieved by turning under the corners and by correctly arranging the parts of the camouflage cover. Local camouflage materials help to blend the screen into the terrain and make it unnoticeable. When these demands are met, the camouflage is highly effective (figure 15).

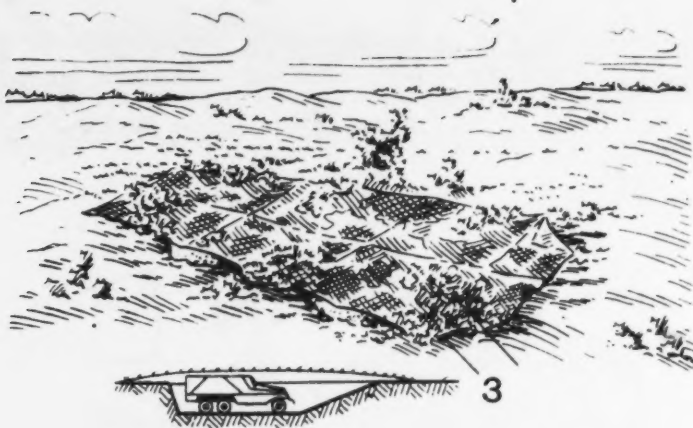
Vertical screens conceal the objects behind them from ground and, in some cases, also from oblique air observation. Most frequently, trench and vertical roadside screens are built.

Trench screens are used to camouflage locations of weapons and structures for observation from ground reconnaissance, and also to conceal the movement of personnel through trenches and communications trenches that are not completely contoured.

Trench screens are installed in sections in direct proximity to foxholes or machine gun positions. The positioning of screens in this manner, and the gaps in the screens, makes possible the conduct of observation and fire through the screen. The construction of screens and the plan for their positioning are shown in figure 16.

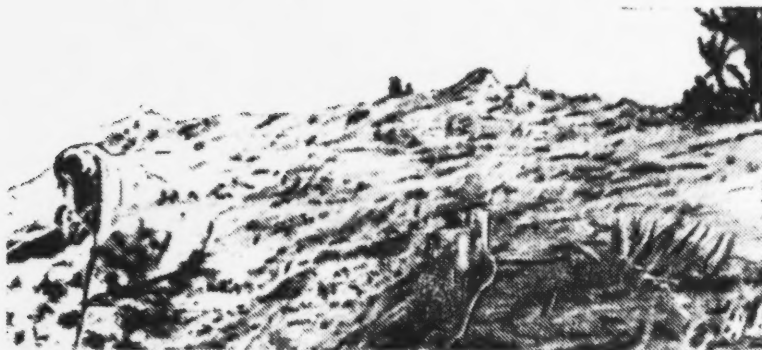
Vertical trench screens can also be used to conceal artillery positions designated to conduct direct fire.

Roadside screens conceal the movement of troops along lateral routes. They are installed along roads on terrain visible to the enemy. The screens



1

3



4

Figure 15. Overall screens.

1. Flat screen
2. Camouflage material found in the area
3. Corner folded under
4. Convex screen concealing antitank gun emplacement

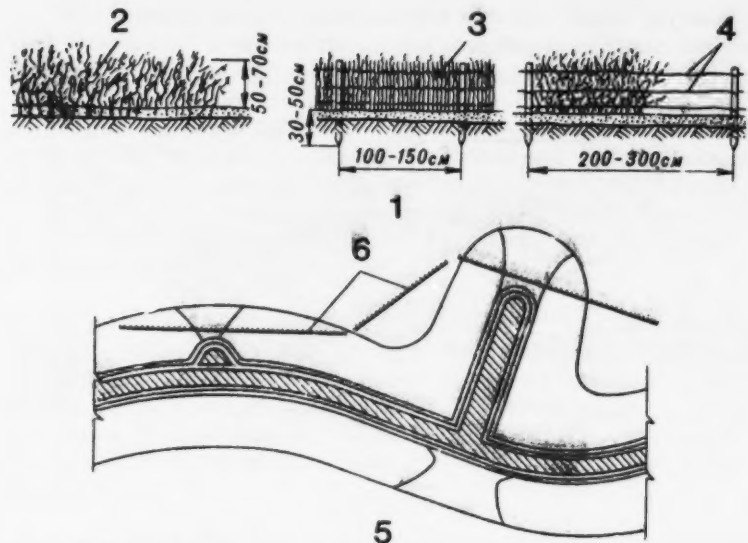


Figure 16. Trench screens.

1. Construction
2. Branches
3. Mats of straw, brushwood, and reeds
4. 2-3 mm wire
5. Plan for positioning along breastwork
6. Position of screens at breastwork

consist of a framework and a screening part (base). The posts for them can be made of poles or beams. They are dug into the ground to a depth of 0.5 to 0.6 of a meter.

The base of the screen is attached to wire or cable stretchers or to stringers of poles or beams. The base is made of local materials or of covers from regulation camouflage sets. A cover 72 meters long and 3 meters high can be made from one set. Designs for vertical roadside screens are depicted in figure 17.

The screens are fastened to the ground with guy wires and anchor pegs.

It is recommended that screens close to the enemy be set up at night or at other times when visibility is limited.

Vertical screens can also be used to conceal the operations of subunits when laying minefields and when building fire installations close to the enemy. Put up on a wide front, including in those places where work is not under way,

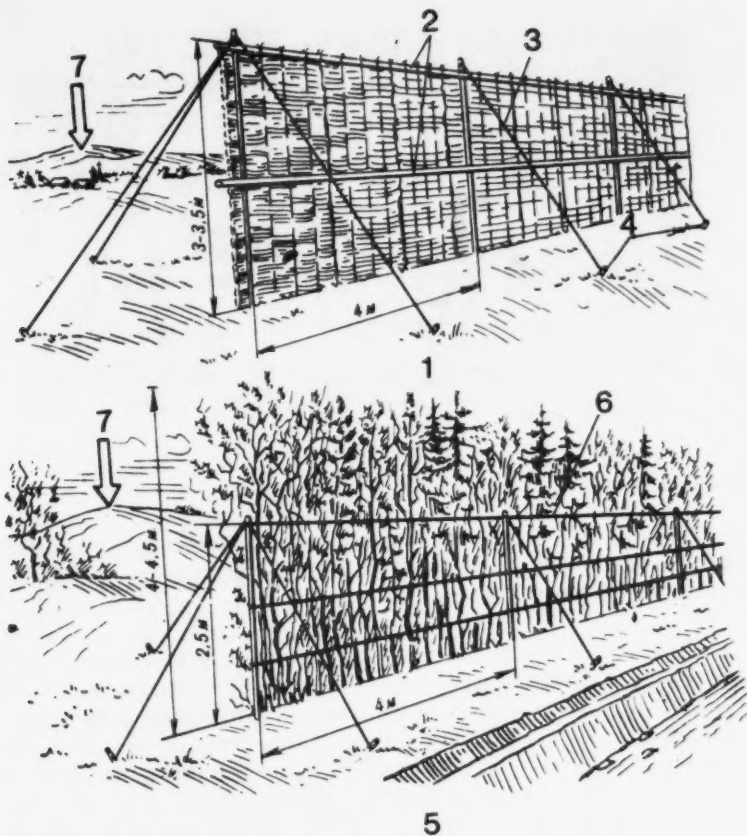


Figure 17. Vertical roadside screens.

1. With a base of straw, brushwood, or reed mats
2. Poles
3. Wire
4. Stakes
5. With a base of cut branches
6. Stretchers made of 2 wires 3mm in diameter
7. Enemy

they do not allow the enemy to determine the exact location of the object being concealed. Of course, the proper sound masking is carried out.

A screen prepared in advance from the MKT-L set (72 meters long) is installed by a squad.

Overhead screens (figure 18) conceal objects placed under them from air reconnaissance. They can be used to conceal mobile communications

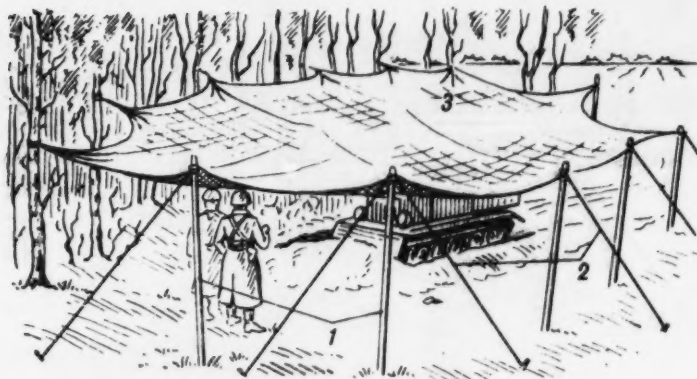


Figure 18. Overhead screen.

1. Posts
2. Guy wires
3. Cover

equipment at control posts and material and equipment in field depots, and also to conceal the construction of emplacements and shelters for equipment and personnel.

As a rule, a screen consists of a framework (posts, stretchers, and anchoring supports) and a cover that is placed over the stretchers and laid parallel to the ground. The distance between the highest point of the camouflaged object and the lowest point of the cover is 0.5 to 1 meter. On the sides from which oblique enemy observation is possible, the edges of the cover are drawn beyond the object by a distance equal to 1.5 to 2 times the height of the screen. Thus, to prevent oblique observation and to reduce the area of the screens, they are placed in clearings or are set next to buildings, borders of forests, groups of trees, or other local objects. The posts are dug into the ground or set on the surface of the ground. In the forest, some of the posts can be replaced by trees. The covers of regulation camouflage sets are usually used as covers for overhead screens.

Screens with large sections are built when there is a need to conceal work on preparing shelters at control posts or to camouflage a large important object.

For the camouflage cover to match the terrain in color, shape, and spotting, spotted areas on the terrain next to the screen are continued onto the cover. If an object being concealed contrasts greatly with the background, the density of filling in its cover (P_3) must be not less than 75 percent, and the object itself is then camouflaged with the regulation cover, cut vegetation, or other local material. The cover is made in an irregular

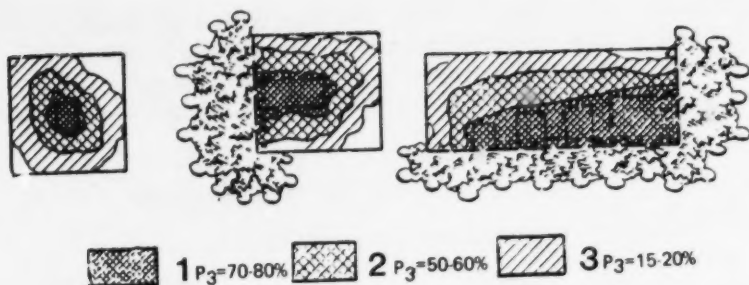


Figure 19. Density of filling in covers for overhead screens.

shape. Parts of the cover that are not next to local objects have a lesser density of filling (figure 19) to make the screen less conspicuous.

Screens made of cut tree crowns are another variety of overhead screen. They are built in the forest to conceal dead-end approaches and objects located in clearings. To build them, stretchers of cable or wire are strung between trees or between trees and posts. Cut crowns or large branches are suspended on rings attached to the stretchers beforehand. The area of the gaps in the screen must not be more than 30 percent. As the crowns wither, they are replaced with new ones.

The awning screen is also a variety of overhead screen (figure 20). It is most frequently built in populated areas. Awning screens can be additions to houses or to other structures. Awning screens are designed to conceal from air reconnaissance unreveted combat and special equipment and motor transport and also material in field depots. Not only regulation camouflage sets, but also boards, plywood, tar paper, and other roofing material can be used for covers.

Disruptive screens (figure 21) are used to camouflage mobile objects by distorting their shapes and shadows. They are used on terrain that has local objects and contrasting spots. The screen consists of several sheaves. The framework can be made of steel reinforcing bars or thin pipe. The framework is hinged to the sides of the vehicle. A cover of fabric is laid on the framework. It is advisable to attach cut branches to the framework to give the camouflaged object greater resemblance to a group of bushes or trees. A few seconds are required to transform the disruptive screen from its transport to operating position.

Mock-up screens are mock-ups of local objects, buildings, cargo, and equipment. A mock-up screen conceals an object by reproducing the appearance of a local feature or object less important to the enemy. Mock-up screens of large equipment, or of a part of a piece of equipment,

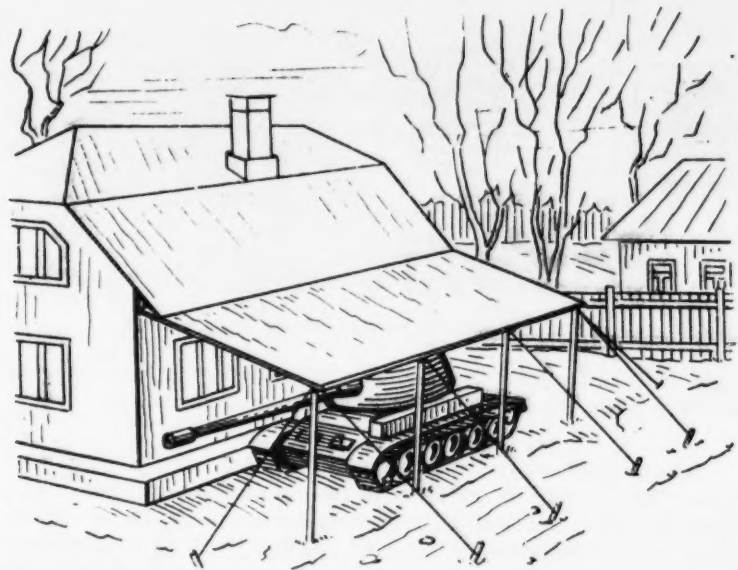


Figure 20. Awning screen.

can be used to conceal rocket launchers. Mock-up screens of buildings can be used to conceal especially important work and sometimes water reference points as well. Mock-up screens of haystacks, stumps, and other local objects can be used to conceal observation posts, armored pillboxes, and other installations.

Radar screens are intended to conceal troops and objects from radar reconnaissance. They are divided into jamming screens and shielding screens.

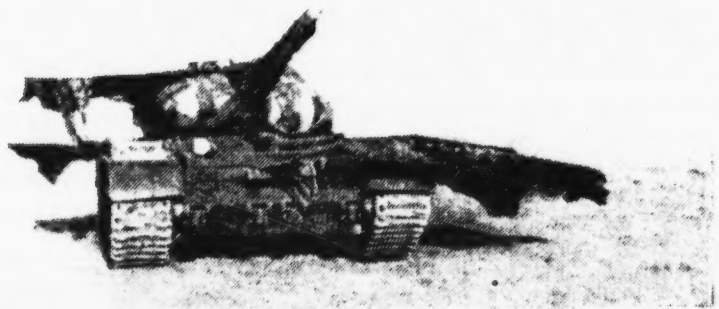


Figure 21. Disruptive screen.

Jamming screens are made from corner reflectors. They reflect enemy radar emissions directed at them, creating interference (light blips) on the radar set. Because of the jamming, the blips from concealed objects are not visible. Jamming screens may be of the linear or area type.

Linear jamming screens are used to conceal troop movement on open sectors of axial and lateral roads (or cross country roads).

Bridges over medium and wide rivers, waterworks, lakes, and other radar reference points can be concealed by area jamming screens. "Pyramid" corner reflectors, used in this type of jamming, are placed on the surface of the water.

Shielding screens conceal objects behind them by blocking the radio waves emitted by enemy radars. They differ from vertical roadside screens only in the construction of the base. Because of the great labor required, screens with a base of mats are used only occasionally.

Installations With Deceptive Contours

Installations with deceptive contours are installations that are smaller in size than standard installations. Because of their shape they blend into the terrain better and, externally, they resemble spotted areas, buildings, or other local objects.

To simplify the concealment of equipment emplacements (or shelters), it is advisable to build them without breastworks. It is also advisable to give piles of dirt and excavations and breastworks around installations geometrically irregular shapes. Covered installations should be built with slanted front walls to conduct fire and observation.

Emplacements or shelters without breastworks are made when the dirt removed during construction is trucked or carried off to concealed sites or is thrown into a river or other body of water.

When trenches are dug, the excavated dirt and, later, the breastworks and the earth around them should be arranged so that there is a resemblance to spots of soil on the terrain.

Covered fire installations with slanted front walls blend in easily with slopes in the terrain, have smaller embrasures, and so are less noticeable.

Camouflage Treatment of Terrain

Camouflage treatment of terrain is the creation of spotted areas that simplify the concealment of objects. This camouflage method is used on

open terrain to reduce the conspicuousness of equipment and installations in subunit dispositions and also to conceal defensive positions.

Spots are arranged in groups. The number of spots in a group must be no fewer than the number of vehicles in the concealed subunit. The number of groups of spots must be one and a half to two times the number of concealed subunits. Installations for equipment and shelters for personnel are placed on or between the spots. Breastworks and the earth around installations are not concealed. Equipment in emplacements or shelters is camouflaged by overall screens the color of the excavated dirt.

Spots are created on terrain covered with grass by removing the sod, by burning or mowing the grass, or, in winter, by clearing the snow and spreading the cleared areas with dirt.

It is best to remove the sod with tanks fitted with dozer attachments. In an hour, a tank can dig five or six spots with an area of 250 to 440 square meters each.

Straw, hay, and also petroleum, waste oil, and other flammable liquids can be used in burning the grass.

Building False Installations

False installations are built when simulating troops and objects where they do not exist. Ground troop subunits most often build the following false installations: one-man foxholes for submachine gunners; trenches and communications trenches; slit trenches; emplacements for tanks, armored personnel carriers, and artillery weapons; shelters for rocket launchers, special vehicles, and trucks; false roads and bridges.

False installations must not differ in appearance from real ones. They should be built along with the real ones, and sometimes even earlier to call the enemy's attention to them.

False trenches, communications trenches, and other fortifications have the same size excavations and breastworks as the corresponding real installations. The depth of false foxholes for submachine gunners, and of trenches, communications trenches, and slit trenches, must be no less than 60 centimeters. When the soil is light, the bottoms of false installations are covered with black soil, slag, turf, small pine branches, and other dark-colored materials to create an illusion of greater depth.

False artillery emplacements must have a depth no less than 50 percent of the depth of real emplacements. If tank mock-ups of less than full height are used (half mock-ups), then the false emplacements for them can be constructed as shown in figure 22.

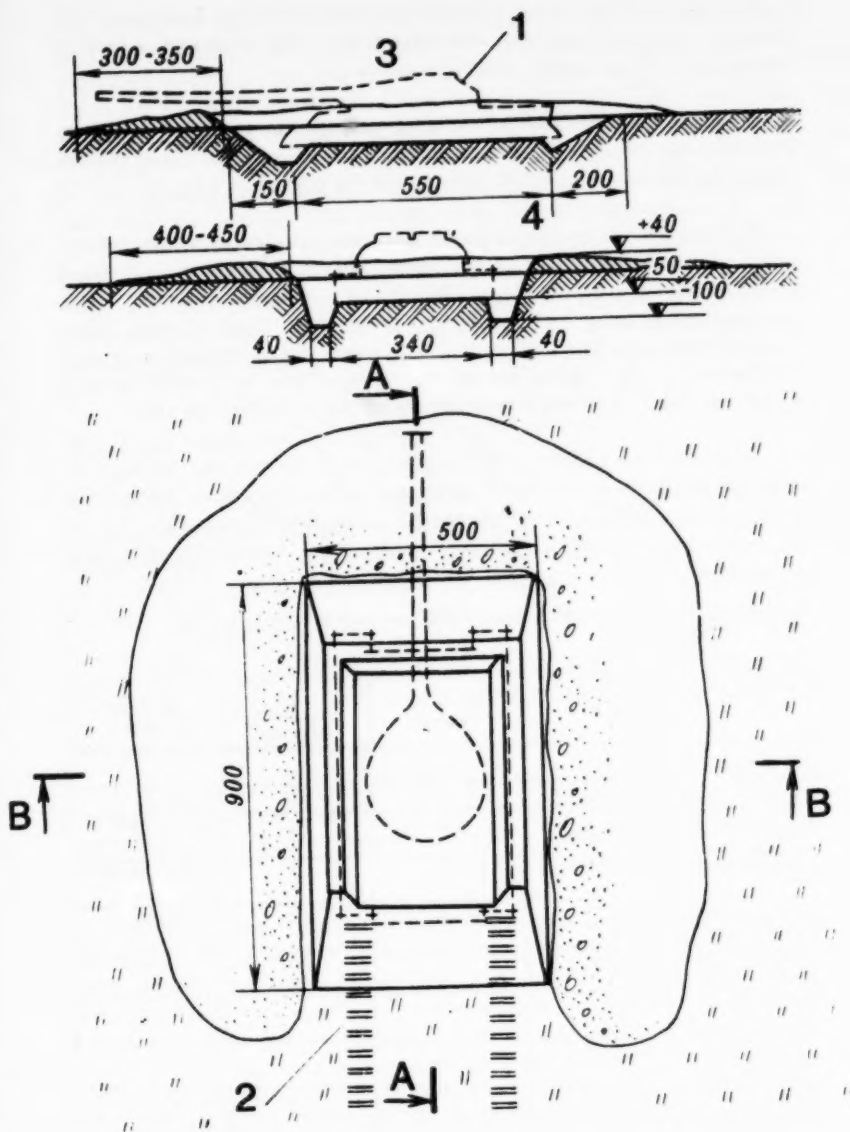


Figure 22. False tank emplacement.

1. Outline of tank mock-up
2. Tracks
3. Section A-A
4. Section B-B

False covered installations for fire and observation are usually cut into the slopes of hills, precipices, and snowdrifts. Great attention is paid to simulating embrasures and entrances.

False emplacements, trenches, communications trenches, and shelters for trucks can be dug in winter by scraping the snow down to the ground and spreading dark-colored materials over the bottom.

Suitable mock-ups of combat or transport vehicles, as a rule, are put into the false emplacements or equipment shelters. Depending on distance from the enemy, and on the availability of men and equipment, false installations are built with machinery or by hand. They are most often camouflaged with local materials to achieve greater similarity to real installations. False installations are camouflaged in a deliberately careless manner so that the enemy can detect them and take them for real.

False covered slit trenches, dugouts, and shelters can be built in summer by removing the grassy cover (on an area equal to that of real installations) and by making "entrances" to the installations. Table 6 gives the approximate times for setting up the most frequently built false installations.

Table 6. Requirements in men, equipment, and time for building false installations.

Installation	By hand, man-days	With machinery, man-days	machine- hours
Trench for three riflemen	0.2	—	—
Trench for rifle squad, 40 meters	5	0.3	0.2 BTM*
Communications trench, 50 meters	5	—	0.2 BTM
Tank emplacement with limited traverse	2	0.4	0.4 BTU**
Tank emplacement with all-round traverse	1.5	0.4	0.3 BTU
Emplacement for armored personnel carrier	3	0.4	0.4 BTU
Slit trench for seven men, 7 meters	0.5	—	—
Emplacement for 85mm (or 100mm) gun	2	—	—
Emplacement for 120mm mortar	1	—	—
Emplacement for 57mm antiaircraft gun	1.2	—	—
Covered slit trench, dugout, or shelter	0.6	0.4	0.2 BTU

Approximate figures are given for average soils for a specific depth; for hard ground the number of man-days is doubled; for rocky ground, tripled or quadrupled.

*BTM—High-speed trencher.

**BTU—Tank-mounted dozer.

The following signs of vital activity of real objectives are simulated at the false installations: roving guns conduct fire from false artillery positions; as time passes, the number of tracks is increased where needed; lights are shown at night; when false installations are built close to the forward edge, typical sounds are reproduced; and so forth.

False roads are laid to false crossings, artillery fire positions, depots, and other false objects. When there is no snow, roads can be made by hand or by cutting the upper layer of soil with a tracklayer. In winter, the snow can be cleared away and the cleared strip can be spread with dirt or other loose materials. In both cases, it is advisable to organize repeated passages of loaded trucks over the false roads. False roads near the forward edge are partially equipped with vertical screens or with radar jamming screens.

Blackout Methods

Blackout consists of concealing and simulating the telltale lights of different objects and of subunit operations. To accomplish these missions, blackout lighting and total blackout are used, light is given off from headlights and from poorly camouflaged openings, and other telltale lights are reproduced.

Camouflage lighting is illumination of the ground or other surfaces so that the light spots created by the light source are not detected by the enemy from the air.

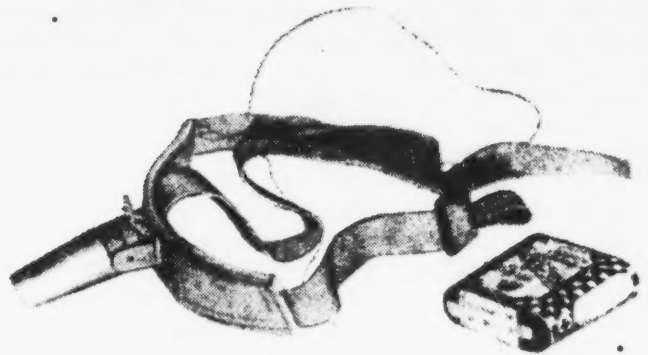
The range at which a light spot is visible depends on its area and intensity. Light spots created on a road by uncamouflaged vehicle headlights can be seen at great distances. Headlight blackout devices are used to reduce visibility.

To reduce the visibility of the light spots, their area is reduced by creating so-called local illumination. To do this, the light source is fitted with cylindrical or cone-shaped inserts of tin or cardboard to direct the light downward. It is also possible to paint electric light bulbs with a dark paint, leaving a small opening to let the light pass through. Ground illumination when there is no snow must not exceed 0.5 lux (2.5 times greater than moonlight). A light spot of 10 square meters will not be visible at 2 kilometers, and a spot of 100 square meters will not be visible at 4 kilometers.

One method of camouflage lighting is the use of individual lighting devices (figure 23). One device consists of a cone-shaped tin cap attached to a wooden block hinged to a metal plate. The device is fastened to the head with tapes attached to the plate. The bulb of a small flashlight is

mounted in the block. The hinge connection between the block and the plate allows the light to always fall downward no matter what the position of the head. An individual lighting device makes it possible to work secretly with a map and to perform other missions. Light from the device is not visible at a distance greater than 75 meters.

A light that is not blacked out at night can be seen at great distances. For example, campfires are visible up to 8 kilometers, and vehicle headlights up to 20 kilometers.



1



2

Figure 23. Individual lighting device.

1. Overall view
2. In use

Using electric lights, smoking, and lighting matches are permitted only under cover of a poncho or other opaque material. Infrared devices with illuminators switched on can easily be detected by the enemy. Thus, they must be switched on only when extremely necessary.

In the Great Patriotic War staffs demanded that troops carefully observe blackouts, especially during movements.

Since visual observation from the air or ground remains one of the main reconnaissance methods, concealment of telltale lights is today an important camouflage measure.

Simulation of telltale lights is carried out when creating false objects or when feigning a march by subunits at night. Most frequently exposed are poorly camouflaged windows of staff vehicles or dugouts, and vehicle headlights, campfires, and night vision devices.

False window openings can be built as covered boxes with lamps inside, or as screens lit from above with box-shaped illuminators. The size of the boxes and screens must be the same as that of the openings being simulated.

The light of vehicles along a road can be made with portable electric generators or with lights properly spaced and mounted in pairs on wooden rods and moved over a road at intervals of 30 to 50 meters.

When preparing for offensive or defensive combat, night vision devices may be simulated on secondary axes. Battery-operated lights, vehicle headlights, or other lights with infrared filters can be used as false sources of infrared light.

The Use of Smoke

Crossings, troop loading and unloading stations, and other objects, as well as subunit operations during combat, can be concealed with smoke screens that hamper or prevent visual observation (including with night vision devices), photography, and other optical reconnaissance. When necessary, smoke screening is performed in conjunction with radar camouflage. Smoke screens are laid in the daytime, on bright nights, or during enemy use of illuminating devices at night.

Smoke screens are divided according to purpose into blinding and screening. Blinding smoke is created in an enemy disposition with artillery smoke devices or aerial smoke bombs. This smoke blinds enemy fire points

and observation posts, denying the enemy the possibility of conducting observation over the battlefield.

Screening smoke is laid near friendly troops or objectives to conceal them from ground or air observation. Most frequently used are smoke pots that are usually placed in a line at equal intervals singly or in groups.

Smoke screens are easily seen from great distances. The smoke must cover at least five times the area of the object being hidden so that the enemy will not be able to pinpoint the object. For this purpose, smoke screens are laid on false axes and in places where there are no objects.

When camouflaging against air reconnaissance, a smoke screen is laid not only over an object itself, but also over the nearest local objects that can serve as reference points.

Smoke screens are laid so that the object being concealed will not be in the center of the smoke-covered area. When crossings over wide rivers are being concealed, smoke pots can be set on islands or rafts, or thrown into the water from launches, rowboats, and other platforms, to create a continuous smoke screen.

A wind of 2 to 4 m/s is favorable for laying smoke screens. Bad weather is a wind speed less than 1.5 m/s or greater than 8 m/s, unsteady gusty wind, and strong rising air currents (convections).

The number of smoke pots needed to cover an object with smoke depends on the size of the area to be screened, the time of smoke screening, the weather, and the pots used. The number of smoke pots (units) needed to create a smoke screen over an object to conceal it by day from enemy air reconnaissance may be determined from the formula

$$N = \frac{FT}{l_1 l_2 t}$$

where

F—area of smoke screen, square meters;

T—length of smoke release, minutes;

l_1 —length of impenetrable screen from one pot, meters;

l_2 —width of smoke at end of screen from one pot, meters;

t—duration of smoke formation from one pot, minutes.

The number of pots obtained from the calculation is increased 10 to 15 percent to have a certain reserve. At night, 30 to 40 percent fewer smoke pots are needed than during the day. With a gusty wind of more than 5 m/s, the number of smoke pots is increased 1.5 times.

Chapter 5. Camouflage in Offensive Combat

Camouflage is carried out before and during offensive combat to hamper or prevent the enemy's discovery of the true disposition of subunits and of their operations and intentions. Camouflage contributes to achieving surprise and reducing losses in personnel and equipment. In fact, the enemy, if it has not discovered unit or subunit dispositions and has not seen troop movements, is not able to effectively use its own weapons.

As is well known, an offensive can be carried out from the march or from a position of immediate contact with the enemy. In any case, the preparation of subunits and units for offensive combat can be discovered from a number of telltale signs. The main ones are an increase in the activity of scouting and reconnaissance groups, the preparation of traffic routes, the delivery of ammunition and supplies, and the making of passages through friendly obstacles.

During preparation for an offensive from the march, telltale signs also include engineer preparation of the waiting areas; the presence of combat, special, and transport vehicles in these areas; smoke from kitchens; preparation, near the forward edge, of positions for artillery and tanks participating in preparation fire; the advance of artillery and tanks to the forward edge of the battle area.

Preparation for an offensive from a position in direct contact with the enemy is also disclosed by increased engineer work in the attack position and by regrouping and replacement of troops during occupation of the attack position for an offensive. Each soldier, sergeant, and officer must know these telltale signs and must conceal them, as far as possible, from enemy air and ground reconnaissance.

During preparation for an offensive, the main mission of camouflage is to mislead the enemy about subunit dispositions, about engineer preparation of areas and positions occupied by units before the offensive, and about sectors for the breakthrough of the enemy defense. All of this is most often carried out by conducting measures to conceal troops and objectives. Feints and measures to simulate preparation for an offensive on false axes may be undertaken on orders of the superior staff or senior commander.

Camouflage in Preparation for Offensive Combat

During an offensive from the march, troop dispositions are far from the forward edge. This prevents ground observation posts from conducting

reconnaissance of subunits in these areas. Thus, equipment and installations are concealed mainly from air reconnaissance. The main means of detection that must be considered here are photography and visual and radar observation.

Subunit waiting areas are assigned on terrain with natural screens and with a developed network of roads and paths. Dense forests with roads and gaps are the best screens. Subunits can also take up dispositions in small populated areas. When troops are in forest dispositions, equipment is placed under the crowns of trees. When troops are in dispositions in populated areas, equipment is placed in various buildings, under awnings, in gardens, and in the shadows of local objects.

As soon as combat, special, and transport vehicles take their positions, they are concealed with regulation camouflage sets or local means of camouflage. The covers of the regulation camouflage sets are given a shape corresponding to local objects. Only after this do personnel start to build slit trenches, emplacements, shelters, and other installations. If engineer preparation of an area is done at night, then installations and traces of work are carefully concealed by dawn.

One telltale sign of tank subunit dispositions is the trail left by the tank tracks. With a little work, the trails are covered with small branches, grass, and other local materials. The trails may be swept away in clearings and on other open terrain by using a tree with a thick crown towed by a tank, armored personnel carrier, or artillery prime mover.

In the waiting area, equipment undergoes camouflage painting and vehicles are fitted with devices for attaching cut vegetation. For dazzle painting in summer, each vehicle must have 2 kilograms of ready-to-use dark brown and earth-yellow paint; in winter, 5 to 6 kilograms each of white paint. Equipment can be painted quickly and efficiently if the painting materials and the patterns for summer and winter dazzle painting are prepared ahead of time.

To camouflage combat equipment and motor transport with cut vegetation, loops of tape are sewn to vehicle covers and tarps, and shackles or short lengths of pipe 30 to 40 millimeters in diameter are fastened to metal and wood surfaces. These devices make it possible to camouflage equipment quickly and well.

Painting vehicles and fastening cut vegetation to them helps to conceal equipment not only in the waiting areas but also in positions, during movements, and in combat.

Local objects are also used to conceal equipment and engineer structures. Here is an example. In August 1943, during preparation for an

offensive, units of the 23d Tank Corps, 115th and 173d tank brigades, and 212th Tank Regiment, which were part of the Southwestern Front, were ordered to occupy waiting areas. The terrain where the units were concentrated was open and viewed to a great depth by the enemy. In many places on the mowed field, hay was piled in stacks, which the tank crews decided to use to conceal their disposition. They dug emplacements for the tanks alongside the stacks; where this could not be done, they dug emplacements in the open field. The vehicles took up their dispositions as the emplacements were readied and were quickly camouflaged with hay. Hay was also used to cover the trail left by the tracks. All the work of building and camouflaging the emplacements, as well as their occupation by the tanks, was carried out only at night. In 4 days, 390 tanks were brought into the waiting areas and camouflaged, 200 of these in the open field. Despite good visibility by day from the enemy observations posts and increased activity by enemy reconnaissance and bomber aviation, not a single tank unit was subjected to air attack or artillery fire.

Where there are no natural screens, a unit or subunit waiting area is designated on a spotted area or on terrain previously occupied by troops. Equipment is placed on spots matching its coloring, and regulation camouflage sets and local materials are used to conceal it. If units or subunits face operations on absolutely open terrain, then each vehicle must be provided ahead of time with a regulation camouflage set. Such a measure was taken, for example, in preparing for combat operations against the Japanese Kwangtung Army in September 1945.

Subunit dispositions are often detected from the smoke of mobile kitchens. Thus, it is advisable to put kitchens in dense forests, sheds, deep gullies, and huts, or under awnings of poles and branches. It is also a good idea to use dry firewood.

A subunit in a waiting area can be concealed only if personnel strictly observe camouflage discipline. This is why movement of combat equipment and motor transport is limited inside a waiting area, and why cutting trees and bushes, building campfires, and laying new roads and paths on open terrain is forbidden. Blackouts are carefully observed. In the last war, some subunit commanders ordered matches handed in so that no one could smoke. Radios are permitted to transmit only to warn units in the air defense network. Strict control over the observance of camouflage discipline is organized by commanders, chiefs, and the provost service. From experience in the last war four to seven men are assigned to carry out provost service in a battalion or artillery battalion.

When occupying fire positions close to the forward edge, tanks, artillery, and other equipment must use concealed routes to move out of their areas.

Sound masking must also be used to conceal movement of tanks to the forward edge because the enemy may use sound reconnaissance to detect their approach. The noise of tanks moving can be drowned out by louder sounds. In the last war, the thunder of artillery fire, the roar of low-flying aircraft, and the noise of transmissions over loudspeakers were used for this.

Positions for artillery, tanks, and other equipment taking part in fire preparation are discovered by the enemy as engineer preparation is performed and as new emplacements and shelters for equipment and personnel appear. Dirt from excavations and breastworks stands out sharply against the terrain and can be detected by visual air observation at 5 to 6 kilometers.

Concealment of positions close to the forward edge is achieved by selecting terrain with natural screens, by using installations prepared earlier by units in contact with the enemy, and also by carrying out engineer preparations at night. Here, as in the waiting area, installations and traces of work must be carefully camouflaged before daylight.

If the terrain can be seen from ground observation posts, vertical screens and radar jamming screens made from metal corner reflectors can be set up to conceal the operations of engineer equipment during work on installations. The materials necessary are prepared in specially allocated sites and delivered at night to the places where the screens are to be installed.

Sound masking is also carried out when needed. In the last war, "silences" were used to camouflage the main artillery fire positions: batteries fully prepared to fire did not fire a single round until a particular time. At the same time, registration fire was conducted with "working guns" whose positions were usually to one side of the batteries' main positions.

Most of the time the attack position for an offensive is set up on terrain prepared by defending subunits. Preparation of the positions is a typical telltale sign of preparation for an offensive. Concealment of this sign is an important camouflage mission.

It is advisable that defending units, feigning reinforcement of the defense and working mainly at night, prepare the attack position. New installations should be built in natural screens. If there are no screens or if they are in short supply, new installations should be set up on spotted terrain. False installations built in the defense can be used to camouflage the new installations. Vertical screens and radar jamming screens made from metal corner reflectors should be set up on open terrain.

To deceive the enemy about our intentions, it is advisable to carry out missions typical of reinforcing the defense: in view of the enemy, "mine" the terrain by laying false minefields, and improve the engineer preparation of positions. Our troops sometimes used this camouflage method during the war with the fascist army. Engineer preparation must be carried out on a wide front, including next to the breakthrough sector.

To conceal the delivery of ammunition and supplies, limited visibility and terrain camouflage properties are used, and engineer and technical camouflage measures are carried out. Delivery is made over roads that pass through woods or dead grounds or that are surrounded with trees.

Dead grounds conceal the movement of equipment not only from visual observation and other optical means, but also from radar. When there is time, screens can be erected on open terrain to conceal movement from ground reconnaissance and radar.

Passages through friendly obstacles are made at night, in fog, or under other poor visibility. Signs marking the passages are concealed from the enemy with local camouflage materials. Today, when the enemy uses night vision devices for reconnaissance, darkness will not always conceal subunit operations in making passages. Thus, it is advisable to use smoke screens. To mislead the enemy about the place and time of making passages, the smoke screens must be laid several times on a wide front before conducting the mission. Hanging the mine-clearing roller units on tanks for making passages through enemy obstacles is carried out in natural screens.

Misleading the enemy about the true breakthrough sector is done to give the enemy the impression of readiness for an offensive where, in fact, one is not planned. It is advisable to conduct reconnaissance on a wide front, including next to the breakthrough sector.

Breakthrough preparations can be feigned on a false axis in a unit's zone of advance. On such axes, specially assigned subunits feign advances, regroupings, and concentrations; they also feign making passages through obstacles. To increase the apparent number of troops on a false axis, false subunit dispositions, control posts, artillery fire positions, tank waiting areas, and other false objects can be prepared, smoke screens can be used, and the noise of equipment and the execution of engineer work can be simulated. Equipment mock-ups must be made especially carefully so that they can not be distinguished from real equipment during observation or photography not only from the air, but also from the ground. At night, the operation of night vision devices can be simulated on the false axes.

Camouflage in Combat

Camouflage of subunit operations (figure 24) in combat is achieved by using terrain camouflage properties and smoke screens and also by

misleading the enemy about our forces, equipment, operations, and intentions.

In combat, soldiers are adapted to the terrain. Disposition behind a bush, fence, or tree, or in a ditch or shell hole, ensures concealment from ground observation.

Reserves are transferred along concealed routes, hollows, gullies, and dead grounds. Smoke shells and mortar rounds are used to blind enemy observation posts and fire points. In the past, smoke screens have been widely used by units of all branches to conceal tank, infantry, and artillery maneuver on the battlefield.

Stratagem contributes to deceiving the enemy. Confirming this is an example from the book *Tactical Surprise* by A. A. Bulatov and V. G. Prozorov. To seize a bridge over the Don in the Kalach area during a counterattack by our forces at Stalingrad, a lead detachment of two motorized infantry companies, five tanks, and several guns was created. The bridge was 30 kilometers from the front. On the night of 22 November 1942, Lieutenant Colonel Filippov led a detachment, with headlights on, through the German defensive line without firing a shot. The enemy, taking the column of the lead detachment for its own troops, allowed it to cross. After overcoming the guard, the detachment seized the bridge and organized an all-round defense. The enemy, recovering, tried several times to retake the bridge but, after losing more than 700 men killed, broke off the attack.

Here is another example. On tactical exercises in the summer of 1972, the commander of an attacking company, Lieutenant Izmaylov, decided to secure an "enemy" strongpoint by misleading the enemy. He ordered a platoon commander, Lieutenant Brovchenko, to carry out a diversion. The noise of this platoon's operations was impressive: explosive charges popped and machine guns and automatic weapons rattled. "Hearing the noise," the officer who led the defense of the strongpoint later said, "we thought we were being attacked head on and prepared a worthy reception. The attackers, after reaching the summit, seemed to halt in confusion; between us there was open, level terrain; try to negotiate that under fire." Combat vehicles periodically conducted fire. The "enemy" was distracted and almost forgot about the flanks. At this time the other two platoons of the attacking company struck. Lieutenant Brovchenko had supported them since the start of the attack. The "enemy" was crushed and thrown back. In analyzing the exercise, the leader emphasized the creativity of the actions by the company commander and his subordinates, noting that it was typical for them to strive not only to "defeat" but also to outwit the enemy and to achieve success with minimum "losses."

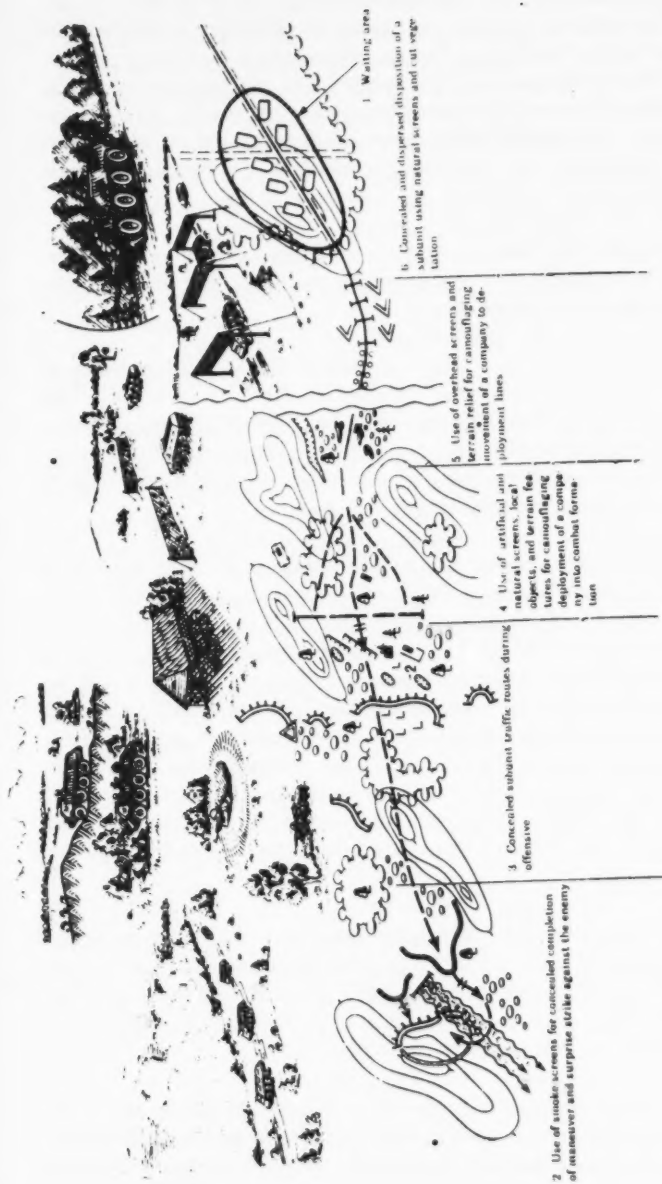


Figure 24. Plan for subunit camouflage during offensive combat.

The effectiveness of stratagem may be shown by this example. Once, the riflemen of the 19th Rifle Regiment could not continue an offensive because of heavy machine gun fire. "Artillerymen, do you have a conscience?" the commander of the regiment demanded. "When will you finally deal with the pillbox?" The commander of one of the guns, Senior Sergeant Gorshkolepov, who displayed great inventiveness, stratagem, and ingenuity in battles at Staraya Russa, Novorezhevo, and other places, proposed rolling his gun out at night into an open position, camouflaging it, and at dawn shooting point-blank through the embrasure. And this was done. The shell from the first round went in through the embrasure and burst inside the pillbox. The machine gun fell silent. The infantry stood up to attack.

Camouflage during river crossings consists of concealing the movement of subunits to a river, concealing the crossings, and deceiving the enemy about the true crossing sectors.

It is advisable to use roads that pass through forests, bushes, hollows, and planted areas to conceal the advance of subunits to a river. The advance of subunits to a water obstacle can be concealed by laying smoke screens. Smoke is also used to conceal the crossings themselves from enemy optical reconnaissance. This camouflage method has been widely used in the past. It has not lost its importance even today.

Bridge crossings are especially carefully concealed. This mission is usually carried out by chemical and engineer subunits. If the situation permits, subunits of engineer troops lay bridges in dead grounds, select places where there are no reference points for enemy aircraft, and, on medium and wide rivers, set up area radar jamming screens to conceal the location of the bridge. Jamming screens conceal the water surface near the bridge, creating on a radar display screen a bright spot whose area greatly exceeds the area of the spot made by the bridge. Reflectors are installed on both sides of the bridge so that it will not be in the middle of the screen. The length of the jamming screen must be four or five times the width of the river. The distance between reflectors is equal to the resolution power of the enemy radar.

If there is ice on the river, inclined screens can be built to conceal the bridge. Concealment of bridges from ground reconnaissance can be achieved with vertical screens that, if needed, are set up on the water. The screens do not allow the enemy to conduct aimed fire on the bridge or to observe the movement of equipment across it.

Feints may be conducted by subunits to deceive the enemy about the location of an assault troop crossing. They can also be used to discover the enemy's fire system in defense on the opposite bank of the river. Here is an

example given by Marshal of the Soviet Union K. A. Meretskov in his book *In the Service of the Nation* (1968): "Massed fire had destroyed the enemy in the second and third trenches. . . . The brief break alerted the Finns. What's this? A mass crossing? Rafts with soldiers floated from the Russian bank. And the concealed fire points on the western side of the river entered the action. But what the Finns took to be men were dummies launched in a feint across the river on rafts and in boats. The first to enter Svir were 16 Guards with these dummies. They were later awarded the title Hero of the Soviet Union. Our observers fixed the positions of the enemy fire points that had come to life and then aimed fire followed."

Deceiving the enemy about the location of real bridge crossings is achieved by building false crossings. During World War II, false bridge crossings were often effective. In preparing the counterattack at Stalingrad, false bridges were built along with the real ones on the Don River. In November 1942 the enemy dropped 200 bombs on the false bridge at the village of Yelan. The real bridge in this area, concealed by screens, did not suffer a single hit.

Two types of false bridges can be built: from "Pyramid" corner reflectors (covered by smoke screens) or from local materials that reproduce the appearance of the bridge being simulated. The false bridge's upper structure of local materials is usually built from beams, boards, cables, and fabric. Regulation or local boats are used as supports. The bridge must be designed so that mock-ups of combat or transport equipment can be placed on it. All the parts of the false bridge are designed for strength. False routes are laid from the main roads to the false bridge, false shelters are built for the "crews servicing the crossing," and equipment mock-ups are placed on the bridge and its approaches. If needed, loudspeakers can be used to reproduce the noise of vehicle traffic, and other signs of crossing activity can be simulated.

* K. A. Meretskov, *In the Service of the Nation* (Moscow: Politizdat) 1968, p. 382.

Chapter 6. Camouflage in Defense

A number of telltale signs can disclose to the enemy the preparation of subunits for defensive combat, the order of battle, and the defense formation. The main signs are engineer preparation of motorized rifle and tank subunit strongpoints and artillery fire positions; engineer preparation of different positions (trenches for submachine gunners and rifle squads, trenches and communications trenches in motorized rifle subunit strongpoints, emplacements for tanks in tank platoon and tank company strongpoints); the type of combat equipment in positions; construction of minefields and other obstacles in front of the forward edge of the battle area; and preparation of routes for maneuver of men and equipment during combat. The enemy detects artillery fire positions by their shape and size, by the joint location of artillery emplacements, by the bright metal parts of guns and other equipment, and by the telltale signs of activity—blast marks, scattered packing, unconcealed shell casings, and muzzle flash.

Various camouflage measures are carried out to conceal maneuver by men and equipment in defensive combat and to mislead the enemy about the concentration of the main forces and the layout of the subunit order of battle, the fire system, and the engineer preparation of defended areas.

Camouflage of the Defense Formation

Camouflaging positions, weapons, command and observation posts, and other defensive objectives and misleading the enemy about the true defense formation are achieved by using terrain camouflage properties, darkness, and other limited visibility during engineer preparation of positions and areas and during other subunit operations; by painting equipment; by using screens made from regulation and local materials; by observing camouflage discipline; by building false strongpoints and other false installations; and by conducting feints to divert enemy attention and fire away from the real objectives.

Combat and transport equipment and defensive installations are carefully concealed. Concealment is conducted from the moment the subunits go over to the defense and is carried out continuously during preparation and defensive combat.

Positions for riflemen, tanks, guns, and other weapons are selected at the edge of a forest, in a grove, in bushes, on the outskirts of a populated area, in spotted areas, and in other places that simplify the concealment of equipment and installations.

Camouflaging tank subunits is complicated. Their concealment against the terrain is possible only when they are in a forest, grove, clump of bushes, or populated area. Not only the main emplacements, but also the alternate tank emplacements are camouflaged. Tank subunit positions on an open site can be camouflaged as alternate positions for riflemen. Tank emplacements are then concealed with regulation and local materials. At the same time, foxholes for riflemen and trenches and other typical installations for motorized rifle subunits are built. These installations may be finished incompletely.

Vertical trench screens can be installed to conceal work on preparing positions close to the enemy. This method was used, for example, at Rzhev in the Great Patriotic War. Captain Rybenko's battalion was 200 to 300 meters from the enemy. At night, vertical screens were installed on orders of the battalion commander in front of the company strongpoints. Personnel could then prepare their positions in secret not only at night, but also during the day.

If an emplacement or shelter is dug by hand, then it is advisable to first remove the upper layer of soil around the excavation and the breastworks. This soil or turf is then used to camouflage installation breastworks and the earth around them.

Positions of motorized rifle subunits in natural screens are matched to the surrounding terrain. On open terrain, they can be camouflaged as unoccupied troop positions. The pit and breastworks of emplacements for riflemen, and the breastworks of trenches, as a rule, are not camouflaged, while adjacent pits, machine gun positions, and other installations are camouflaged as breastworks. Forward traverses are matched to the surrounding terrain. Slit trenches adjacent to trenches or communications trenches can be covered with mats of straw, brushwood, or reeds and covered with a layer of soil. When time permits, the mats are smeared with a clay or lime solution. These screens protect personnel against napalm and the luminous radiation of a nuclear blast. Camouflaging emplacements for personnel and equipment, as well as shelters for special vehicles and motor transport, is simplified if these installations are built without breastworks.

Cut vegetation is widely used to conceal installations and equipment. Withered vegetation is replaced with fresh. If this is not done, the enemy can discover the location of the concealed object. Here is an example. In 1943, Lieutenant Karpukhin's platoon was on combat patrol near the

village of Romanovka. The squads camouflaged their emplacements at night with aspen branches. In the daytime the positions were impossible to detect. The next night, the camouflage should have been renewed, but this was not done. The next day, the branches turned brown. The squad positions stood out clearly against the green vegetation. The platoon suffered unjustified losses from enemy fire.

Emplacements for tanks, artillery, and armored personnel carriers on spotted terrain can be camouflaged to resemble patches of bare earth.

Open terrain not occupied by subunits may be spotted for camouflage. Spotting consists of using dozer attachments, bulldozers, and other vehicles or other methods to create spots that differ in color and brightness from the surrounding terrain. It is advisable to camouflage emplacements and other installations to resemble spots. The number of spots must not be fewer than the number of concealed installations.

Camouflaging minefields and barbed-wire obstacles is done by adapting them to the terrain, by using inconspicuous barbed-wire obstacles, by painting mines set on the ground a protective color, and by laying minefields at night and during other limited visibility. False minefields may be created to deceive the enemy about the mined sites.

Field dumps of mines are placed in natural screens as close as possible to the mining sites. Mines are delivered to the dumps over routes concealed by natural or artificial screens. When laying antipersonnel minefields, preference should be given to mines that do not require breaking the surface of the ground. Combat engineer personnel are given camouflage suits when laying mines in winter.

All installations in positions and in strongpoints are camouflaged with regulation or local materials. The initiative of teams, crews, and drivers in concealing equipment and installations is unlimited.

It is almost impossible to completely conceal strongpoints and defended areas, artillery fire positions, and other objects, especially on terrain with a lack of natural screens. Therefore, in camouflaging the defense formation great importance is attached to creating false strongpoints, defended areas, and artillery fire positions, which should be prepared on unoccupied sectors when the real installations are prepared.

It is a good idea to create false strongpoints on elevated ground, on forest edges, and on other sharply delineated terrain. Such dispositions are plausible and add to deception of the enemy. Colonel V. Ivanov, in his article "To Ensure Survival of the Battery," gives this example. In an exercise, an artillery battery fire position was on the reverse slope of a hill.

The artillerymen built a false fire position at the edge of a grove 500 meters from the fire position and closer to the enemy. The careful concealment of all installations at the real position and the movement of personnel and vehicles at the false one misled the "enemy," who took the false position for the real one and planned to neutralize it. In real combat, many shells would be fired at the false position, but they would fall on empty ground. Survival of the actual position would be ensured.

False emplacements and other installations are built at the false positions, and equipment mock-ups and screens are set up to simulate camouflaged combat vehicles. Vehicle tracks are laid to the mock-ups and screens.

It is advisable to build false emplacements and shelters and false trenches and communications trenches with the same equipment used to dig the real installations. Troop activity is simulated at the false positions.

False installations are built mainly in false strongpoints and in false artillery positions. Slit trenches, dugouts, and emplacements are prepared to protect the personnel of the simulated crews. The overall number of installations in a false strongpoint or position, as well as the quantity of mock-ups, screens (indicating camouflaged equipment), and real equipment detached to make the scene appear realistic, depending on the tree cover of the terrain, must be such that the enemy can not tell the false strongpoint from the corresponding real strongpoint or fire position.

Table 7 gives the approximate extent of missions in false strongpoints and requirements in men and equipment for preparing strongpoints.

Subunits of the corresponding branches are called on to prepare the false strongpoints or artillery fire positions. Engineer subunits set up the mock-ups and build the false obstacles, and, with the help of their mechanized equipment, assist in preparing the real and the false installations.

It is advisable to cover part of the false installations with vertical trench screens and to carelessly camouflage them against air observation. Such measures will make the false installations appear more realistic.

The false strongpoints, artillery fire positions, and other false objects draw artillery fire. This reduces subunit losses when the enemy conducts artillery preparation.

False installations, strongpoints, defended areas, and other false objects were widely used by our troops in preparation for and during defensive combat in the Great Patriotic War from 1941 to 1945. For

Table 7. Approximate extent of missions and requirements in men and equipment to prepare false strongpoints.

Missions	Strongpoint: motorized rifle company in first position in direct contact with enemy	Strongpoint: motorized rifle company in depth of defense	Strongpoint: tank company in depth of defense
Building false installations:			
Emplacements per squad	9	9	—
Trenches and communications trenches, meters	—	600	—
Covered slit trenches or dugouts	13	13	—
Emplacements for tanks and armored personnel carriers	5	5	6-10
Construction of soil spots (200 to 300 square meters each)	—	3	6
Installation of mock-ups of tanks or armored personnel carriers	2-4	2-4	4-6
Deployment of regulation camouflage sets for simulating camouflaged equipment	2-3	2-3	2-3
Required for preparation:			
Personnel, man-days	50-60	12-14	6-7
Equipment, machine-hours	—	4 BTMs* 3 BTUs**	5 BTUs

*BTM—High-speed trencher.

**BTU—Tank-mounted dozer.

example, in July 1942, south of Yukhnov, 6 to 7 kilometers from the forward edge, false defended areas of tank units and subunits were prepared. In 7 areas more than 160 equipment mock-ups were installed (including more than 120 tank and tank turret mock-ups), 8 machine gun pillboxes and 33 rifle squad emplacements were built, 2.5 kilometers of triple-row barbed wire were put up, and 30 kilometers of tank tracks were laid. These false areas were subjected 12 times to artillery and mortar fire. In the Kursk salient in the summer of 1943, false trenches, antitank-gun emplacements, and other false installations were built in and between the battalion defended areas and in the forward position. Dummy soldiers were placed in the trenches. At night, false barbed-wire obstacles were built. Small arms fire was used to make the installations appear real.

To camouflage a fire system, all weapons and installations take up dispositions in natural screens, are adapted to the terrain, and are carefully concealed with regulation screens (figure 25) and local materials. Alternate, temporary, and false fire positions are also prepared for this purpose.

Artillery and mortar positions are placed in hollows, behind populated areas, and in other dead grounds. Such placement of artillery

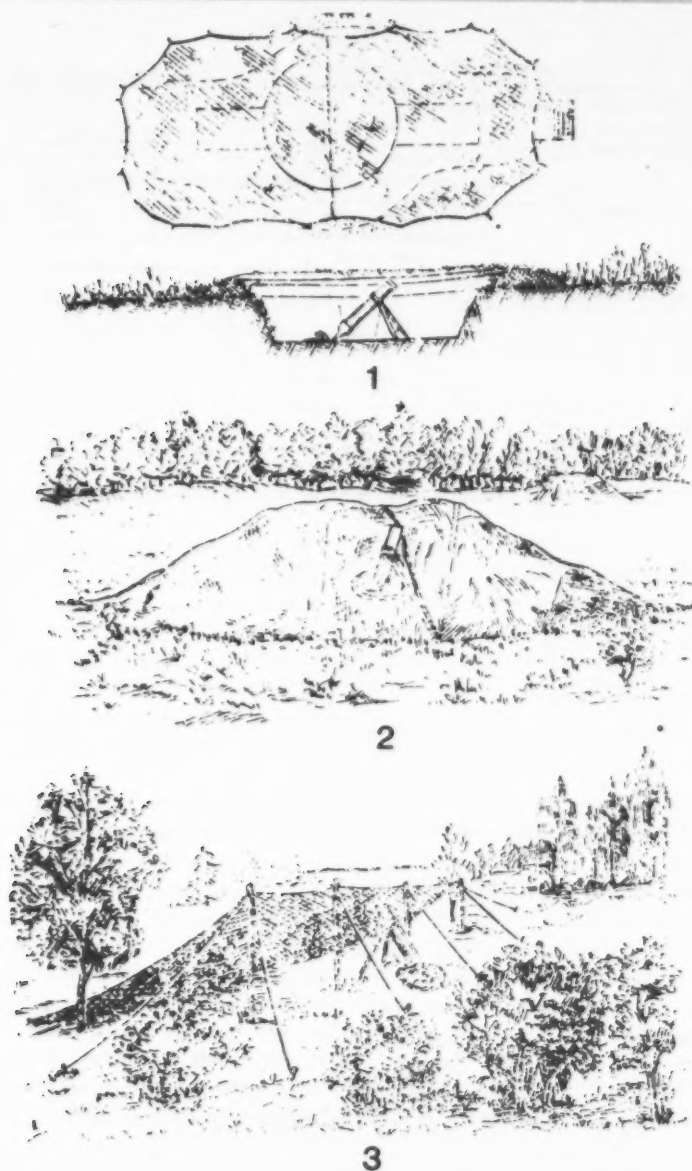


Figure 25. Camouflaging a mortar with a regulation screen.

1. Flat cover
2. Overall emplacement screen
3. Inclined screen

positions was first used by our artillerymen in the Russo-Japanese war of 1904-1905.

Trench screens can be built to conceal weapons from ground reconnaissance of motorized rifle subunit positions visible to the enemy. They are set up in front of submachine gunner and machine gunner foxholes and in the spaces between them. Building a screen 10 meters long and preparing the materials demands 1.5 to 2 man-hours. Trench screens must not hinder vision from positions in the depth of the defense. Fire from alternate, temporary, and false fire positions helps to conceal the fire system. Such fire is conducted with roving guns, tanks, and other weapons.

Command-observation and observation posts (figure 26) are positioned on the edges of forests, groves, or groups of bushes, or in trenches and communications trenches. Preference is given to terrain with a developed system of roads and paths. If helicopters or other aircraft are used for communication, then landing areas are set up far from installations, on northern edges of forests and groves. If observation posts are armored, they are painted the color of the surrounding terrain and cut vegetation is attached to their surfaces. The vision slits in the observation posts are concealed with an MKT-T camouflage set or with screens of nets and local camouflage materials. Open observation posts are camouflaged from air reconnaissance with covers from regulation camouflage sets. When the MKT-T set is used, local camouflage materials are added so that the cover's density of filling will be not less than 70 percent. Trench screens can be used to conceal installations from ground reconnaissance. Communications trenches at command-observation posts are covered with overall screens that match the surrounding terrain. Not only regulation camouflage covers, but also mats of brushwood, straw, and other local materials can be used. Lenses of openly located observation equipment are fitted with shades to prevent reflection from glass surfaces.

Camouflage of the defense formation can only be effective if subunit personnel observe camouflage discipline. When in defense during direct contact with the enemy, excessive movement must be avoided, especially over open sites, and commands must not be given in a loud voice. If enemy aircraft appear, all movement must cease. Special attention is paid at night to concealing telltale lights. It must be remembered that a burning cigarette is visible at 0.5 of a kilometer and a lighted match at 1.5 kilometers. Smoking in the open is thus forbidden. It is also forbidden to disturb the terrain near an installation (to trample or destroy the vegetation), to leave behind ammunition boxes and canned food containers, or to spread clothing on the ground or hang it in trees to dry.

Failure to observe camouflage discipline can result in casualties. Here is an example. In the fall of 1942 Captain Leonov's battalion had taken up

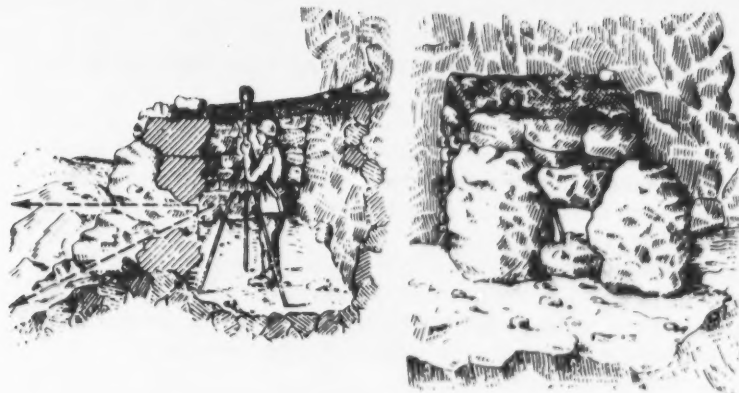


Figure 26. Camouflaging an observation post in the rocks.

the defense near Sestroretsk. Most of the soldiers observed camouflage discipline. The enemy, preparing for an offensive, did not conduct fire for a few days. Two soldiers from one of our companies crossed an open sector standing straight up instead of crawling as the others did. They paid with their lives.

The importance of observing camouflage discipline may be judged from another example borrowed from an article by S. Ya. Mirontsev. In the Great Patriotic War an antitank battery was ordered to secretly occupy an advantageous position to ward off a tank attack the enemy was preparing. The battery reached the designated area at night, prepared the fire position, and camouflaged it well. Morning came but the enemy did not attack. Evidently, the attack had been postponed. The day and the following night passed quietly. The artillerymen felt "at home" in their new positions and began to "visit" one another and to talk louder. The enemy noticed all this and opened heavy fire on the battery. The advantageous position had to be abandoned.

Concealment of Subunit Maneuvers in Combat

Routes that pass through forests, bushes, and dead grounds are used to conceal the movement of subunits to fire lines and deployment lines for counterattacks. Routes of advance are marked by signs clearly visible day and night to friendly troops but not visible to the enemy.

When a defense is being prepared on road sectors visible from enemy observation posts, vertical screens, supplemented by metal corner reflectors, may be installed if time permits.

If a maneuver is carried out in dry weather in the summer, subunits moving along field roads can be detected from clouds of dust. It is thus

advisable to select roads with a hard surface for the advance of subunits. Smoke screens can also be used to conceal the maneuver.

Camouflage in Defense Under Special Conditions

It is more difficult for an enemy to conduct reconnaissance in a city because of the many buildings and other local objects. Radar reconnaissance from air or ground is almost impossible. The effectiveness of visual and photo reconnaissance is much lower than under ordinary conditions. The troops' use of basements in buildings and of underground communications lessens the amount of work in preparing positions. Thus, the main telltale signs around installations—breastworks and the earth around them—are missing. These circumstances make it possible to reliably conceal strongpoints, artillery positions, and other objects. For the same reason, it is pointless in a city to build false strongpoints and other objects. The preparation of artificial screens to conceal equipment and installations is easier because of the great quantity of local materials in a city.

Concealing strongpoints, positions, troop dispositions, control posts, and other objects is simplified in defense in the mountains by the many gorges, valleys, and steep-banked rivers and by the rugged terrain. If mountain slopes are covered with forests, the forward edge must be carried deep into the forests when the defense is organized. This will make it more difficult for the enemy to discover the defense formation.

Strongpoints, artillery positions, and other objects at road intersections and in valleys constantly draw the enemy's attention. These objects must be concealed especially carefully. It is advisable to locate reserves, dumps, and medical aid stations in caves on the reverse slopes of hills.

A lack of roads can cause vehicle tie-ups when carrying out a maneuver, and this makes camouflage of the troops more difficult. Thus, the use of darkness, fog, overcast weather, and snowfall to conceal movement is more important than under ordinary conditions. Mountains amplify sounds: as a result, sound masking must be observed especially strictly.

The frequent weather changes, rocky ground, sharp daily temperature fluctuations, and rarefied air hinder the conduct of engineer support missions. The preparation of false strongpoints and other false objects calls for detaching many men and a large amount of equipment.

In winter when the snow cover is dense, the concealment of equipment and installations in positions is more difficult because of the uniformity of the landscape. Mixed and particularly leafy forests and groves cease to be

good natural screens. Snow finds wide use as a local camouflage material when concealing military objects. When the snow begins to thaw and is easy to work with, it can be used to build shelters over emplacements for submachine gunners and over communications trenches and other trenches.

Blast marks are more visible in winter than when there is no snow because the powder fumes from the firing of artillery melt and darken the snow. The blast marks are periodically covered with clean snow.

Because it is more difficult to conceal the tracks of equipment and the traces of installations in winter than at other times of the year, the construction of false positions is more important. When the snow is deeper than 30 centimeters, false emplacements, trenches, and communications trenches are set up by clearing the snow down to the ground and sprinkling the bottom of the installation with dark materials. When the snow is less than 30 centimeters deep, not only is it cleared away, the ground is dug out to a depth of 20 to 40 centimeters.

If snow cover is light, the following is advised to conceal unreveted equipment from optical reconnaissance: vehicles without winter coloring are placed on dark spots, and vehicles painted with protective or dazzle paint are placed on snow so that the shadows fall on dark spots.

Concealing strongpoints, artillery fire positions, and other objects in defense in a desert is complicated by the absence of natural screens and by the open, level terrain. As a result, the construction of false installations, false strongpoints, and other false objects, and the use of protective and dazzle paint for equipment, is more important than usual. High daily temperatures in summer, dry air, frequent winds, and sandstorms reduce the work capacity of personnel. Thus, the work in preparing false installations increases sharply. The great quantity of dust raised during troop movements simplifies the simulation of unit and subunit maneuvers.

Chapter 7. Camouflage on the March

Subunits carry out marches when an encounter with an enemy is expected and when there is no threat of such a clash. In either case, troops may be detected by air reconnaissance, agent reconnaissance, or, during movement close to the enemy, by ground reconnaissance of typical telltale signs. These signs include reconnoitering of traffic routes, halts, and rest areas; preparation of routes and organization of provost service; composition and length of march columns and direction of subunit movement; tie-ups of personnel, combat equipment, and transport at barely passable route sectors; subunit positioning at halts and rest areas and engineer preparation of occupied areas.

From the list of telltale signs, it is evident that the enemy can establish not only the fact of movement but also the composition of subunits, the direction of their movement, and, by making a comparison with other data, the purpose of the regrouping being carried out. Thus, camouflage must include measures to conceal march preparations, columns on the move, and the locations of units at halts and rest areas.

Camouflage During March Preparation

A subunit usually carries out a march over a single route as part of a unit or as an independent column. The traffic route, sites for short and long halts, and day and night rest areas are indicated to the battalion or artillery battalion by the senior officer. But conditions may force subunit commanders to make a march plan independently.

When selecting a traffic route from a map, a battalion or artillery battalion commander must consider not only road conditions but also terrain concealment properties. First of all, hard-surface roads through forests or planted with trees with thick crowns are used. Such routes make high-speed travel possible and help to conceal the march from air reconnaissance at any time of day or night.

Concealing troops from enemy radar reconnaissance (during a night march and in other limited visibility) is also ensured on route sectors through populated areas. Movement through or alongside embankments, ditches, and gullies adds to concealment. Sites for halts and rest areas are selected on terrain with a sufficient number of natural screens.

At a short halt a column usually does not leave the road, taking position along it on the right side according to the direction of movement. Thus, it is better to make brief halts in forests or where the road is planted with trees with closed crowns. The demand for natural screens for concealed disposition of subunits depends on the length of the columns. If one considers that at a halt the distance between vehicles is reduced to 10 meters, the extent of forest or planted road can easily be determined by starting with the amount of equipment in a subunit.

At a long halt or in a day or night rest area, a battalion or artillery battalion may leave the road, taking up dispositions by company or battery. Spots should be selected in thick forests, in bushes, or in gullies grown over with trees or brush. As a rule, natural screens directly on the route or close to it are used. The march column must always be able to return rapidly over existing roads to the main route without reforming. The size of natural screens for concealed disposition of a motorized rifle battalion may be judged from figure 27. A smaller area of natural screens is needed for a tank or artillery battalion.

When daytime rest areas are selected, time must be correctly calculated. The traffic timetable must provide for possible delays on the route and ensure that a subunit will arrive at its designated area and occupy it before daylight comes. Before the movement starts, the route, halts, and rest areas are reconnoitered, the route is prepared, and provost service is organized. If a battalion or artillery battalion makes the march as part of a unit, these measures are organized and carried out by decision of and with the resources of the senior officer; if the movement is made as an independent column, then by the battalion or artillery battalion itself.

Preparing for a march, the battalion or artillery battalion commander must provide for the concealment of subunits sent out ahead on the traffic route. To do this, he must attentively study terrain concealment properties on the map, determine the best time for reconnaissance and route preparation, and point out concealed places for halts by the subunit assigned to reconnaissance and places for setting up provost posts. The subunits sent out on the route must be given precise missions for the order of concealed operations, including what to do if enemy air reconnaissance appears or the local population is met.

Subunits detached on reconnaissance over open terrain must advance without halts. When investigating natural obstacles and road works, the patrol stops in places sheltered from enemy air reconnaissance and from observation by local residents and sends foot patrols to the objective. After conducting their reconnaissance, they join the main component of the patrol, take their places on transport equipment, and move on to the next obstacle.

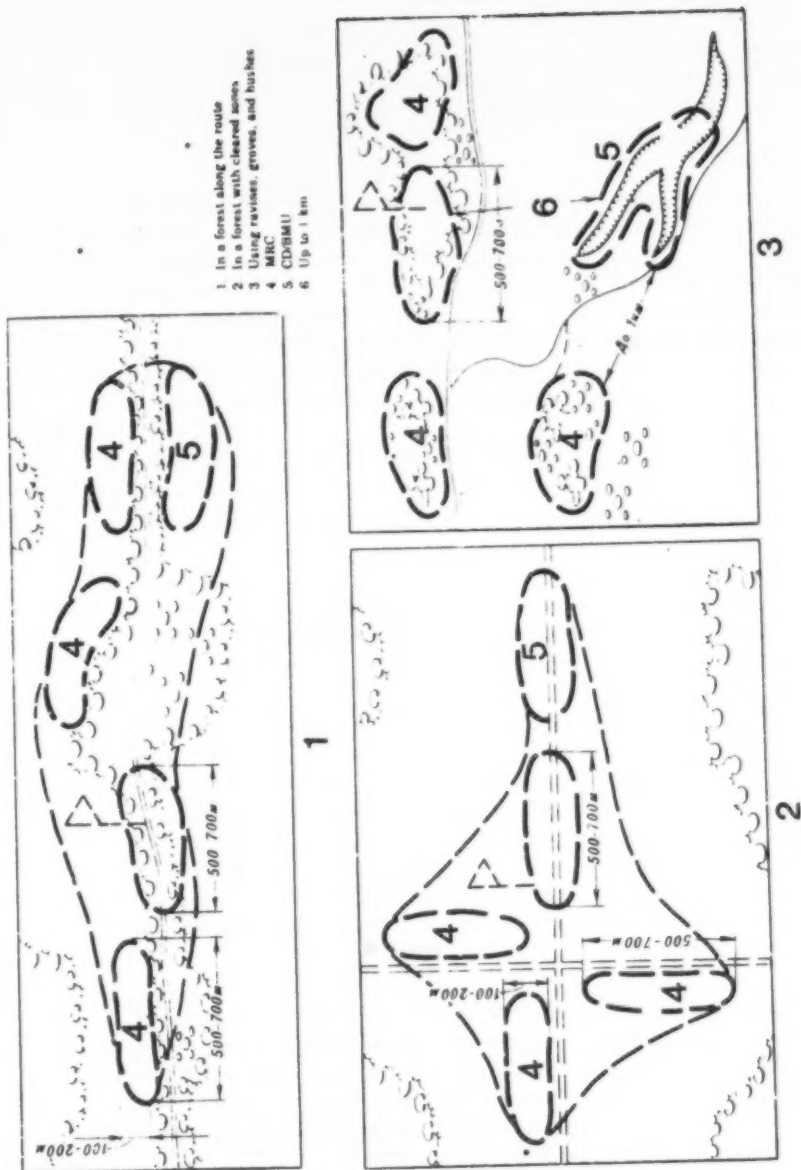


Figure 27. Dimensions of natural screens needed to conceal a motorized rifle battalion at a long halt (or in a rest area).

Reconnaissance of rubble, ruins, contaminated terrain, and bypass routes is conducted quickly. Stops should be made only to designate directions for making passages or for finding and designating bypass routes. The use of helicopters adds to secrecy in conducting the route reconnaissance organized by senior officers.

Preparation of the route is carried out as far as possible under limited visibility and in the shortest time before the start of troop movement. Wide use is made of mechanized equipment, prefabricated road and bridge materials, and route markers.

The route is marked with signs and markers that are easily seen by moving troops. But, in posting the signs, it is necessary to adapt them to the terrain so that they are not seen from the air. It is best to designate a route prepared for night movement with MBF (figure 28) or FKG illumination equipment. If there is no regulation marking equipment, signs and markers are prepared by the troops using flashlights, sheet metal, plywood, and cardboard. The illuminated signs must have deflectors (figure 28) to ensure that light is spread only in the direction of the route.

Dangerous route sectors are also marked with a set of changeable stencils (figure 28). It is important to observe blackout requirements when they are installed: the electric bulb must not be placed opposite the opening in the stencil.

The methods of marking the traffic routes at night and the distances between signs depend on the condition of the road, the natural illumination, the outline of the road, and the terrain.

On routes using good straight roads, the signs are usually posted on the right side according to the direction of traffic. Only turns, road works, and intersections are marked. On irregular terrain, on routes with many intersecting roads, and on cross country trails over virgin land, the markers are set so that a driver can see no fewer than two at once. On moderately broken terrain, this distance may be 75 to 100 meters. On barely passable and dangerous sectors (with defiles, obstacles, bridges, road works, and other hazards), the signs are placed along both sides of the route every 30 to 40 meters and also at the start and end of the hazard.

When there is no illumination equipment to mark the route, it is possible to use small panels (of plywood or boards) covered with luminous or white paint and set on stakes, or stripped branches painted with black and white stripes. In the Great Patriotic War white stripes were painted on roadside trees. On moonlit nights, this made it easier for drivers to keep to the road and permitted travel with headlights shut off.

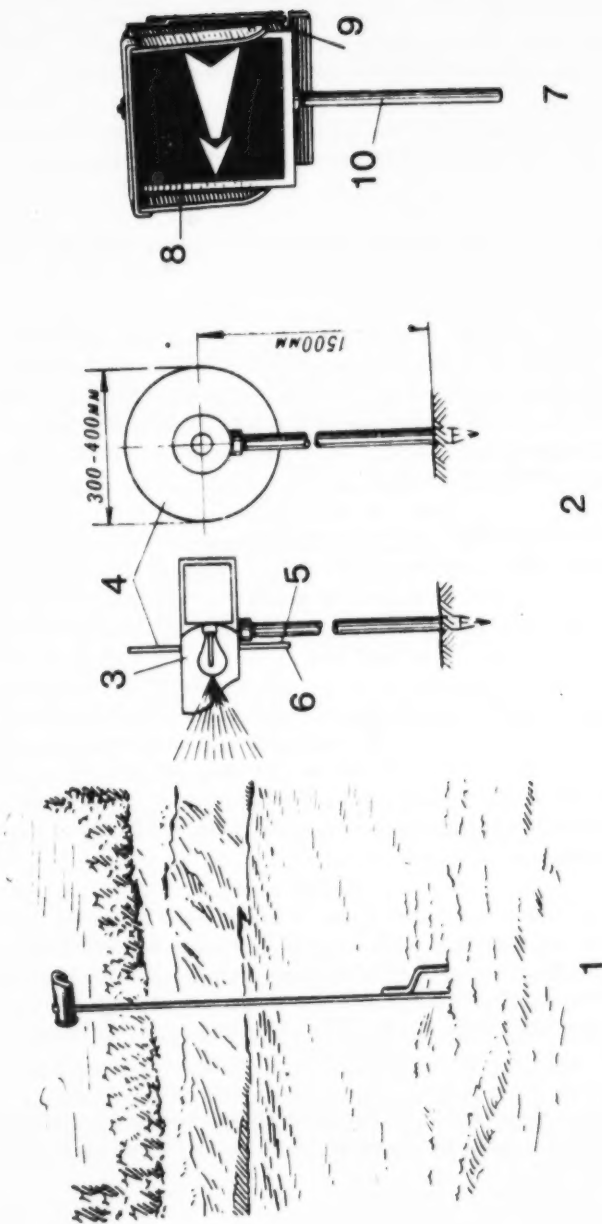


Figure 28. Illumination equipment for designating routes.

1. Factory-made MBF marker; 2. Marker prepared in the field; 3. Metal or wooden case; 4. Disk; 5. Green; 6. White or yellow; 7. Marker-indicator with set of changeable stencils; 8. Changeable stencil; 9. Marker body; 10. Post

When provost service is being organized on the route, the following measures, which will add to camouflage, can be recommended. The provost posts and traffic control posts should be sent out immediately before the start of the march. It is better for the personnel of the quartermaster stations and traffic control posts to take up dispositions not on the route but in the nearest natural screen before the arrival of the column at that point. When a march is made at night, the traffic control service must have signal lights with blackout inserts or deflectors.

The subunits sent out on reconnaissance to prepare the routes and to carry out provost service must avoid contact with the local residents.

Camouflage of Troops on the Move, at Halts, and in Rest Areas

Movement of columns, as a rule, is organized at night and during other limited visibility. The rich experience of World War II convincingly showed the advantages of darkness. Most major troop regroupings were carried out at night. Nighttime was also widely used by units and subunits. After conducting a concealed march, they went into battle with the enemy on new axes with complete surprise.

Radar and infrared devices for air reconnaissance in the hands of our probable enemies hinder concealed operations at night. But darkness has not lost its importance even today. It is important to know how to combine darkness and terrain concealment properties to camouflage columns on the march.

When a march is under way, blackout requirements and the commander's order of movement must be strictly observed. Each combat and transport vehicle must be fitted with blackout devices. Subunit commanders are obliged to verify the presence and condition of these devices, especially the good working condition of blackout headlights, before starting to move.

It was pointed out in Chapter 3 that blackout headlights have three blackout modes: undimmed, partly dimmed, and fully dimmed. Table 8 gives the maximum detection ranges for light emitted by vehicles with blackout headlights. Figure 29 shows the range of visibility of road obstacles and the permissible speeds of travel depending on the blackout mode.

The subunit commander determines the blackout mode to be used (the unit commander does this when movement is as part of a unit) and bases

Table 8. Maximum range for visual detection of vehicle lights.

Type of light	Range of detection, meters, during ground observation	Range of detection, meters, during air observation from 1,000 meters
Headlights and illuminated road sectors in mode: Undimmed Partly dimmed Fully dimmed	7,000-8,000 2,600 800	Up to 10,000 Up to 3,500 2,200
Front and rear side marker lights	350-400	
Front and rear turn indicators	500-600	
Distance indicator and "Stop" light	700-800	
Underbody light (illuminated sectors of road and rear axle)	1,000-1,200	
Side screen with electric lighting	300	

his decision on route conditions (possibility of enemy reconnaissance, road condition, and travel speed).

The undimmed mode can be used in the deep rear of friendly forces when there is no threat of enemy air reconnaissance and there is a need to carry out a march at high speeds. When the enemy is at a great distance and when road conditions are good, the partly dimmed mode is used. Going over to the fully dimmed mode is necessary close to the front line and on steep winding grades. Headlights are shut off completely when a column is in obvious danger of detection by enemy air reconnaissance.

During any use of blackout headlights, the underbody light (for trucks) and the side screen with electric lighting (for tracked equipment) must be turned on. These devices, and the distance indicators, allow drivers to keep their positions behind the vehicle ahead and to maintain the necessary distance even when headlights are shut off.

Vehicles without blackout devices should be in the middle of a column. To prevent accidents, it is advisable to use white lead, lime, or chalk to make a circle or square not less than 20 to 25 centimeters in diameter on vehicles without blackout devices.

These recommendations for blackout can not, of course, be used mechanically. Other methods may be used in a specific situation.

On the march, troops must remember that enemy air reconnaissance pays special attention to open and barely passable route sectors. Thus, on route sectors without natural screens, defiles, or bridges, troops must travel at the highest possible speeds and make no stops. If bridges and roads are destroyed, or if there is rubble in narrow places, all measures must be taken

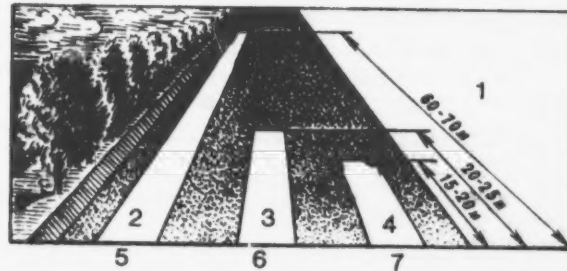


Figure 29. Route visibility and permissible speeds for vehicles equipped with blackout devices.

- | | |
|---------------------------------|------------------|
| 1. Visibility of road obstacles | 5. Undimmed |
| 2. 50-60 km/hr | 6. Partly dimmed |
| 3. Up to 25 km/hr | 7. Fully dimmed |
| 4. Up to 20 km/hr | |

to rapidly get under way again. If there is a long delay at an obstacle, an approaching column should stop in the nearest natural screens. Combat and transport vehicles that break down should be taken off the road to shelters and camouflaged.

Subunits on a march are not called on to carry out engineer and technical camouflage on traffic routes. Such measures are usually carried out with the senior officer's men and equipment. Linear radar-jamming screens and vertical road screens can be set up on open route sectors (in a zone of enemy ground reconnaissance activity), and smoke screens can be laid on crossings and approaches. Subunits on the move must be able to use engineer and technical methods to conceal their own movement and, when needed, must assist subunits in carrying out camouflage. When passing through a smoke screen boundary, tanks and other vehicles fitted with smoke devices must be ready to lay smoke screens in breaks that form in the smoke cloud.

Fog, low dense cloud cover, and rain are good for concealing all operations. Just as in the Great Patriotic War, they must be widely used when a march must be made in daytime.

Conditions can force subunit commanders to carry out a march by day in good visibility. One possible way to ensure that subunits can move to new areas without being noticed is by moving in single or small groups of vehicles at considerable intervals. The transfer should be carried out by moving rapidly from one natural screen to another.

When stopping for a brief halt, subunits must quickly occupy places under tree crowns along the side of the road and observe camouflage discipline. Subunits must not go out on the road or onto open terrain.

To ensure a concealed position, reconnaissance groups must be sent to areas designated for long halts and day and night rests. These groups will determine the conditions of natural screens in an area and, when troops arrive, will direct them to suitable and concealed dispositions. Vehicles are dispersed only after the columns have pulled into a forest or other natural screen.

Combat and transport vehicles are placed under tree crowns, in their shade, in bushes, on the shaded slopes of ravines, and in gardens and buildings in populated areas. When necessary, equipment is given extra camouflage with regulation screens and local materials. Fortifications built in the area must be concealed especially carefully. Recommendations on troop camouflage in dispositions are discussed in more detail in Chapter 8.

The provost service and the traffic control service have a special role in ensuring troop camouflage on the march. The provost posts and the controllers sent out from the subunits must get precise instructions from their commanders and are obliged to stop the slightest violation of camouflage discipline during movement of a column and at halt and rest areas. Orders from provost posts are mandatory for subunit commanders and for all personnel of a moving column.

The camouflage of troops on the march in winter has a number of special features. The leafy and mixed woods and roadside plantings have lost most of their concealment properties. Ravines suitable for concealed disposition in summer can not always be used in winter because of snowdrifts and the absence of approach routes. All this must be considered when selecting a traffic route and places for halts and rests.

Coniferous forests are the most suitable places for halts and troop rest areas. When temperatures are low, populated areas can also be used for subunit dispositions.

When occupying forests it is especially important to see that equipment is not dispersed until a column is completely withdrawn into the natural screen. Slit trenches must be dug and paths laid out under the cover of tree crowns. Tracks formed on open sectors must be carefully camouflaged by sweeping the snow.

Long winter nights, snowfall, and snowstorms sharply limit the enemy's ability for air reconnaissance and must be widely used for carrying out marches by units and subunits.

Snowfall and snowstorms add to camouflage, but make orientation of troops on the terrain more difficult. Special attention must be paid to marking the traffic routes.

Providing personnel with winter camouflage clothing and using winter dazzle paint on weapons, combat equipment, and transport vehicles is quite important.

Chapter 8. Camouflage During Disposition for a Halt

Depending on the combat operations and the situation, a subunit's length of time in position and its composition (with or without reinforcement) can vary. This affects the number and type of telltale signs. It must be remembered that with an increase in the length of disposition the number of telltale signs grows, and there is an increase in the probability that subunits will be detected and attacked by the enemy. Camouflage must therefore be continuously improved during the entire time troops stay in an area.

The main telltale signs of subunit dispositions for a halt are:

- arrival of combat equipment, personnel, and transport and special vehicles;

- construction of access roads from the main roads and the appearance of new vehicle tracks, paths, and trampled ground;

- preparation of an area with emplacements for combat vehicles and security and with shelters for personnel and transport;

- movement of small subunits and individual vehicles, and regular gathering of personnel at mess areas;

- smoke from kitchens, campfires, and stoves (in winter), and, at night, light from lanterns, headlights, and fires;

- noise of running engines during movement and mechanized excavation of fortification trenches;

- operation of communications equipment;

- conduct of training exercises.

To eliminate these telltale signs, camouflage must be carried out to conceal occupation of the disposition, the units in it, engineer preparation of the area, and troop activity.

Requirements for Selecting and Occupying Concealed Dispositions

A unit commander directs a subunit to a disposition. But, when nuclear weapons are used, important changes in the terrain's concealment properties and appearance are possible. In the areas assigned to troops, natural screens may have been destroyed, and the terrain may be unsuitable for a position. Subunit commanders must therefore be able to independently select dispositions that satisfy camouflage requirements. The terrain in the area must ensure dispersal of a battalion by company, as well as concealed and suitable positioning of combat equipment, weapons, and personnel, and must permit rapid movement from natural screens to the main traffic routes.

It is better to use forests, ravines grown over with trees and bushes, quarries, and other natural features for concealed positioning of subunits. These screens also offer extremely good protection against nuclear blasts. But the danger that troops will be defeated because of obstacles and fires creates definite difficulties in the use of forests. Most suitable for troop occupation are small forests; on terrain with large forests, use can be made of sectors next to gaps and borders that will permit a rapid exit from zones of fire and destruction. Small populated areas may be used for concealed disposition in winter, especially when temperatures are low, and also when forest areas and areas of broken terrain are limited.

When a battalion or company takes up a disposition in a forest, only the area directly occupied by subunits is considered a natural screen. Within this area, combat equipment, weapons, and transport are positioned with squads, teams, and crews at distances that prevent the simultaneous destruction of two adjacent subunits and their equipment by a single high-explosive bomb or medium-caliber shell. With trenches and shelters, this distance is 25 to 30 meters; without them, 50 to 70 meters.

The same dispersal is called for when using ravines.

If populated areas are used for concealed positioning of troops, one courtyard is allotted to one or two squads, teams, or crews.

In accord with the indicated dispersal, when personnel are in dispositions in slit trenches and equipment is in the open, approximately 5 to 6 hectares of forest, 10 to 12 courtyards in a populated area, or 500 to 700 meters in a ravine are called for to conceal a motorized rifle or tank company.

Concealment of an artillery or mortar battery requires 1.5 to 2 times fewer natural screens.

When emplacements and shelters for equipment are built along with slit trenches in subunit dispositions, the requirement for natural screens is 2 to 3 times less.

However, the type and number of natural screens still do not give a full picture of the capabilities for troop concealment. For this, the concealment properties of the screens themselves must be known. For example, when forests are occupied, the types of trees and density of their crowns are considered, as are the existence of approach routes and the ease of positioning subunits.

Any forest may be occupied in summer, spring, and early fall, but the better ones are large forests consisting of such types as maple, linden, oak, and beech. In winter, on the other hand, coniferous and mixed forests are used.

The main index of a forest's concealment properties is the density of the tree crowns (C_k). The concept of crown density was given in Chapter 4 and it was pointed out that equipment and installations are reliably concealed in a forest even when engineer and technical camouflage methods are not used if crown density is 0.5 or more. If values of C_k are less than 0.5, objects will require additional camouflage with regulation devices or local materials. Determining crown density in the field calls for skill in visually estimating crown size and making computations. Thus, when preparing an area, the concealment properties of a forest can be characterized more conveniently by comparing the intervals between neighboring tree crowns with the diameter of the crowns. The diameter of the crowns and the distance between them are easily measured in paces.

Table 9 gives approximate procedures for camouflage depending on the distance between tree crowns expressed in fractions of crown diameter (d_k). Crown densities corresponding to these distances and general descriptions of forest density are also shown.

The data in the table make it possible not only to estimate the concealment properties of a forest, but also to determine approximately the camouflage measures needed with the use of engineer and technical devices.

When selecting forest dispositions, preferences should be given to sectors where tree heights vary. There are many shaded places in such a forest, and, during air observation and aerial photography, this type of forest appears variegated and ensures good camouflage.

When evaluating populated areas as natural screens, the number of auxiliary structures (sheds and awnings), which can be used to conceal

Table 9. Conditions for concealing subunits in a forest from optical air reconnaissance.

Distance between crowns	Crown density	Forest thickness	Necessity of employing technical means of concealment
Less than $0.3 d_k$	0.5 and greater	Dense	Engineer and technical camouflage devices not required
$0.3 d_k - 1 d_k$	0.5-0.25	Average density	Engineer and technical camouflage methods required in some cases
$1 d_k - 2 d_k$	0.25-0.1	Sparse forest	Objectives extending beyond tree crowns or their shadows, as well as vehicle tracks, must be camouflaged with engineer and technical devices
Greater than $2 d_k$	Less than 0.1	Sparse forest	Obligatory use of engineer and technical devices for concealment of each individual objective and vehicle tracks

equipment, and basement areas, which can be used to shelter personnel, is considered. Consideration is also taken of trees, high enclosures, and other local objects on farm plots that can add to camouflage.

The condition and quality of natural screens are decisive in concealing troops. Thus, one important mission is the organization by subunit commanders of timely, all-round engineer reconnaissance of natural screens in dispositions.

The operations of reconnaissance groups sent out for this purpose must be organized so that they have sufficient daylight to conduct engineer reconnaissance and so that positions for personnel and equipment will be determined before subunits arrive in an area.

Organized and concealed occupation of an area by a battalion's subunits is important in ensuring troop camouflage. If a troop movement is carried out at night, it is advisable to complete the approach to the area, the withdrawal of columns into natural screens, and the positioning of subunits before dawn. When movement is during the day, bad weather is made use of as much as possible when occupying an area. As troops arrive, the officers and sergeants who conducted the reconnaissance meet the subunits and quickly direct them to the assigned positions. Columns are forbidden to halt on the road and subunits must not gather on open terrain while awaiting positions.

Occupation of an area is carried out only over existing roads, and, if there are no roads, over newly laid trails. Dispersal of subunits in an area and occupation of assigned places are carried out after the march columns have entered the natural screens. If this requirement is violated, tracks that simplify enemy detection of arriving subunits will be left on open sectors.

Subunit commanders must be particularly attentive in observing the requirements of camouflage discipline when occupying an area and searching for positions. Blackout and sound masking are violated most often precisely at this time. Newly arrived subunits must immediately begin camouflaging their dispositions.

Camouflage in Dispositions

Subunit commanders, when organizing camouflage, must understand clearly which telltale signs will have the greatest effect on detection of the troops. Air observation and photography show that troops are revealed not so much by their equipment as by their work on building fortifications and their violation of camouflage discipline.

Camouflage in natural screens is easily carried out during a brief disposition by subunits when no fortifications are built in an area or when only slit trenches are dug for personnel. Combat equipment, transport vehicles, and small slit trenches can nearly always be concealed under tree crowns, under awnings, in sheds, or in ravines, and can be quickly camouflaged from air observation. This has been confirmed in military exercises.

For a number of reasons, the possibility of detecting subunits is much greater when emplacements and shelters for combat and transport vehicles are being dug.

First, the size of objects being camouflaged is sharply increased. Thus, an emplacement dug by hand for an armored personnel carrier is seven or eight times larger than the armored personnel carrier itself. When a tank emplacement is dug with a tank-mounted dozer, the surface of the ground that is disturbed is 15 to 20 times the size of the tank. Installations of such size, as a rule, extend beyond the edges of tree crowns.

Second, the bare soil of ditches and breastworks contrasts sharply with the surrounding terrain. Eliminating this contrast demands time and materials and is not always done expertly.

Third, because it is inconvenient to camouflage the soil that is removed when installations are dug, the principle of continuity of camouflage is violated. This is because work on concealing emplacements and shelters begins only after earthworks are completed. For example, a squad can manually dig an emplacement for an armored personnel carrier in 5 to 8 hours. Only after the work is done does the squad start to camouflage it. Installations dug by machine also remain uncamouflaged for a long time. Thus, with a tank-mounted dozer, a tank emplacement is dug in 30 to 40

minutes. A team then takes another 2 to 3 hours for additional preparation and camouflage. In this time, a tank with a dozer attachment can dig four or five pits. Consequently, during preparation of a disposition for a tank subunit, up to 50 percent of all emplacements are always uncamouflaged. Under such conditions, subunits can be detected by air reconnaissance in the first flight over the area.

Fourth, the difficulty of using dozer attachments in a dense forest forces tank subunits either to make clearings or to excavate pits in glades, gaps, or on forest edges. But this makes camouflage considerably more difficult.

The problems just discussed in building fortifications are decisive in determining the type of camouflage for subunits and the procedure for conducting it.

In a *forest* disposition, camouflage depends on the density of the forest. From table 9 it is evident that in a dense forest artificial camouflage devices are certainly not called for. Occupation of a natural screen already ensures reliable concealment of troops from air reconnaissance at any time of day. It is only necessary to camouflage access roads from the main road and to observe camouflage discipline.

Shaded spots and the screening effect of tree crowns must be used more carefully in forests of average density. Equipment is positioned and emplacements and shelters are excavated under cover of the branchy crowns of trees. Parts of vehicles and sectors of fortifications extending beyond the crowns are camouflaged with regulation devices and local materials. The light-colored soil from emplacements and shelters that is visible in breaks between tree crowns must be camouflaged not only after installations are finished, but also while earthworks are being dug by continually throwing branches, grass, moss, and dead wood over it.

In a *sparse forest* (figure 30) the use of the concealment properties of tree crowns in combination with artificial screens ensures effective camouflage of equipment and installations only under certain conditions: if the excavation and camouflage of emplacements and shelters are carried out at night and completed before daylight or are performed under other limited visibility; if the troops do not carry out fortification work in the area or are limited to digging slit trenches for personnel.

In the remaining cases, along with the camouflage of combat and transport vehicles, emplacements, and shelters, special attention must be paid to concealing installations being built. When digging emplacements and shelters, using local materials to periodically cover the dirt removed may prove insufficient.

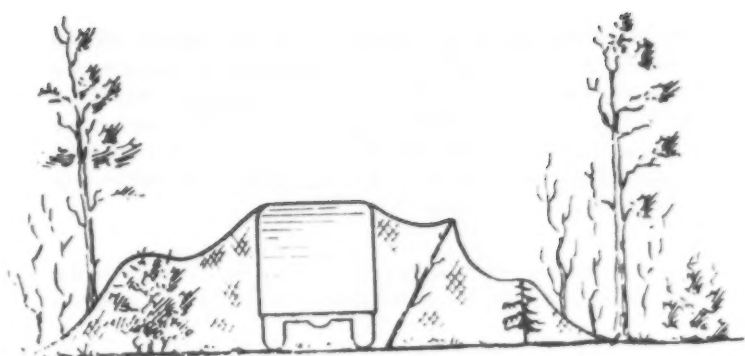


Figure 30. Shape of a screen cover when camouflaging equipment in a sparse forest.

It is advisable to use overhead screens to camouflage fortification work in sparse forests (figure 18). Screens are erected over excavation sites before the beginning of work on installations. Screen covers are hung from tree trunks or fastened on stakes at a height at which excavation of the emplacement is convenient and installation of equipment in the finished emplacement or shelter is possible.

Cover size and shape are determined by the dimensions of the work area to be concealed and by the location of trees in the forest. The excavation site of the emplacement must be selected so that it will be encircled on its perimeter by trees and bushes. This makes it possible to have an overhead screen of minimum size. In places where the screen does not touch trees and bushes, the cover must extend beyond the camouflaged object. The overhang of the cover is made big enough so that the object will not be observed obliquely. In a sparse forest, the overhang may be $1/2$ – $2/3$ the height of the screened area.

It is best to build overhead screens with the regulation MKT camouflage sets. Large areas are camouflaged with one and a half or two sets. Branches, moss, and other local materials are fastened to the cover to create the needed density of filling over broken ground and to ensure the inconspicuousness of the screen. The sets are connected and camouflage materials are added to them on the ground, and then the covers are raised and suspended at the required height. Overhead screens are not removed until the installations are built and camouflaged.

In motorized rifle and artillery subunits, and also in supply and service subunits, squads or crews install or remove screens. In tank subunits, when emplacements are dug with dozer attachments, it is advisable to select from the crews teams of four to six men for each tank-mounted dozer.

Regulation screens and local materials may be used to conceal equipment openly located in a forest. In a sparse forest, in clearings, and where vegetation is scattered, it is preferable to use regulation camouflage sets with the addition of tree branches, moss, and grass. To make screens blend into the surrounding terrain and to make their outlines resemble bushes and tree crowns, they must be thrown over objects, as well as over nearby vegetation, freely and loosely (figure 31).

When camouflaging equipment with local materials it is better to use large branches, laying them on top of vehicles and leaning them against the sides.

Emplacements and shelters with equipment, and also broken ground in a forest visible to the enemy, must be concealed especially carefully. Installation emplacements are usually covered with regulation camouflage sets and local materials. It is recommended that the bottom of an excavation also be covered with local materials before a cover is installed.

Rather than use branches, it is better to camouflage breastworks and the earth around installations, areas stripped of grass, and vehicle tracks with fallen leaves, pine needles, moss, and dead wood—materials found on the ground in the forest.

When using cut vegetation, attention must be focused not on carefully covering bare ground so that the color will resemble the surrounding background, but on seeing that the characteristic outlines of installations are distorted as much as possible. For this purpose, local materials are scattered not only on broken ground but also alongside installations to make them look like groups of bushes (figure 31, a).

If there is heavy damage to the vegetation cover (from excavation with a tank-mounted dozer), the camouflage material is distributed evenly in a thin layer over the entire area. Besides this, tree branches are placed more thickly on its separate parts in accord with the shape and size of the bushes or tree crowns (figure 31, b). The greatest effect can be achieved by sticking the branches vertically into the breastworks or earth around an installation.

To camouflage combat equipment and emplacements, regulation tarps can be used successfully in combination with local materials.

Personnel carrying out camouflage must show ingenuity in adapting objects to the terrain and must not fall into routine in the use of camouflage methods and devices. In this respect, here is an instructive example of camouflage by a tank company on an exercise in 1970.

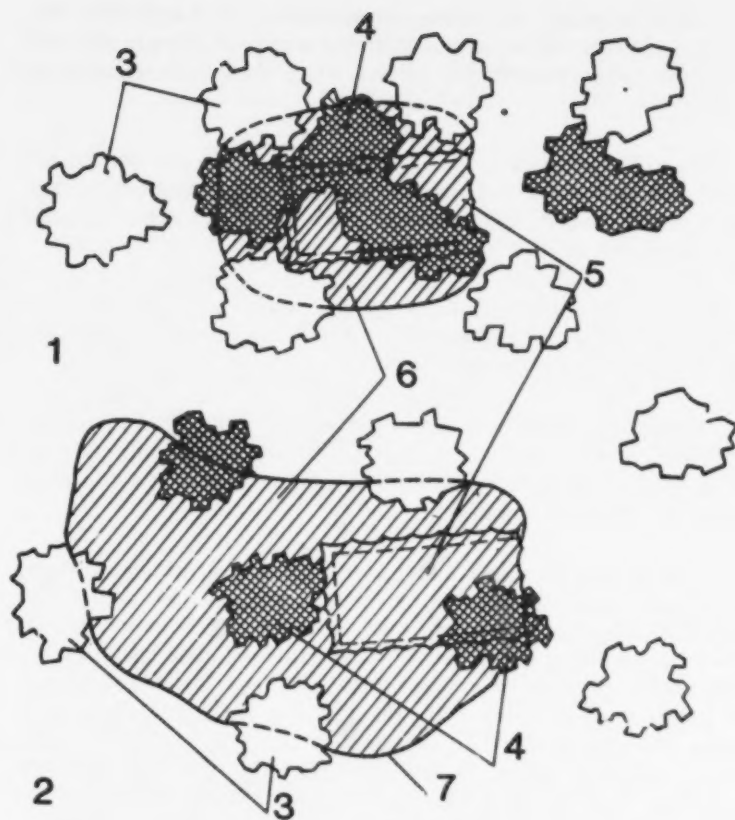


Figure 31. Methods of camouflaging installations with regulation screens and local materials.

1. In a forest of average density
2. In a sparse forest
3. Tree crowns
4. Cut vegetation
5. Regulation screens
6. Fallen leaves, pine needles, fallen branches
7. Border of breastwork

A disposition was assigned to a company in a sparse forest. Not all crews had regulation screens. For tanks without standard screens, the company commander ordered that emplacements be dug next to trees with the biggest crowns and camouflaged by throwing on large branches. Branches were fastened vertically on separate sectors of the breastworks.

For tanks with regulation camouflage devices, emplacements were dug

near individual bushes and small trees and were covered with MKT sets. Tree branches were thrown on to increase the density of filling in the cover. Covers were turned under at the corners, which made them resemble tree crowns.

One tank was next to a tree in a large clearing dotted with hillocks and was covered with a tarp. Turf and tall grass were spread evenly on the tarp. This created a complete impression of a marshy hillock, which surrounded the camouflaged object.

Because of skillful adaptation to the terrain and the variety of camouflage methods, the company was well concealed in the disposition. This was confirmed by air observation.

Subunits in a forest must not reveal themselves by making clearings. Preparation of wooden structures to cover slit trenches and dugouts must not be in direct proximity to troop positions. The subunit commander decides on preparation areas.

When laying out trails and building emplacements and shelters, clearing the forest is permitted by thinning out the undergrowth and cutting off the lower branches of thick tree crowns. It is important that subunits occupying a forest are not visible from the main traffic routes. When positioned along forest edges, gaps, and roads, combat equipment and transport are removed to the depth of the forest depending on its density and undergrowth. For concealment from ground observation, vertical screens of freshly cut brushwood, tree branches, or regulation camouflage sets supplemented with local materials can be installed on sectors where the terrain does not permit moving deep into the forest.

When *ravines* are used for equipment and shelters, places are selected on the side of shaded slopes and in the shade of trees and bushes. Camouflage is carried out with regulation camouflage sets and local materials.

When subunits are on ravine tops or ridges, the sector of the ravine as a whole, rather than each piece of equipment or each installation, can be camouflaged. Flat overall screens that reproduce the surrounding background are built, or concave screens are set up to show an unoccupied ravine sector. To make the screens, it is better to use regulation camouflage sets, which can be joined to make one cover of the necessary length and width. The cover is supplemented with local camouflage materials to match the surrounding (artificial) background and is secured to both sides of the ravine under tension (with a great deal of overhang). Some types of camouflage for equipment in a ravine are shown in figure 32.



Figure 32. Methods of camouflaging equipment in a ravine.

1. Screen abutting a slope
2. Completely screened ravine
3. Simulated road on screen cover

In *populated areas*, buildings, enclosures, and other local objects on farm plots are used for the concealed disposition of subunits.

Combat and transport vehicles are concealed by placing them in auxiliary buildings: in sheds, storehouses, or under awnings. If there are too few auxiliary structures, or if they are too small, equipment is put in shaded sectors next to buildings, along fences, and in gardens, and is camouflaged to resemble surrounding local objects. Besides regulation camouflage sets, prepared structures and articles (panels, doors), roll paper and roofing materials, plywood, cardboard, hay, straw, and other local resources are widely used to build screens. It is advisable to make the screens look like awnings and extensions of buildings, as shown in figure 20.

Personnel occupy basements, cellars, and lower floors of buildings. Emplacements and shelters for equipment are built, when possible, under awnings and inside or alongside structures—under cover of overhead screens set up ahead of time and made from regulation camouflage sets.

On *open terrain*, troop camouflage presents great difficulties. But practice shows that even here it is possible to successfully conceal subunits by skillfully adapting them to broken terrain, local objects, and variegated sectors of the background. For example, at a military exercise conducted in steppe country, a subunit occupied a disposition in a comparatively sparsely wooded strip. Personnel quickly positioned combat equipment in the shade of trees, and prepared and camouflaged slit trenches for themselves. Regulation screens, grass, and fallen leaves were used to camouflage equipment and installations. Access from the main road was made through a well-worn track along a planting. All movement was forbidden in the area. The subunit was reliably concealed for a long time. Although air reconnaissance knew the approximate search area, after several dozen flights scout aircraft could still not detect anything.

If the terrain is monotone and featureless, camouflage to match the surrounding background is laborious and not always effective. Artificial spotting can be used to improve the camouflage properties of such terrain.

Artificial spotting is usually carried out on a unit scale directly in subunit dispositions and away from troop positions. The areas of spotted terrain and their mutual distances are determined by the unit commander in accord with the dispersal of troops adopted for the specific situation.

In subunit dispositions, the number of spots must exceed the number of camouflaged pieces of equipment (or installations). In places not occupied by subunits, the number of spots may be fewer. For example, camouflage of a motorized rifle or tank company calls for setting up no

fewer than 12 to 15 spots in its disposition and 10 to 20 spots in one or two other places.

Methods of constructing spots can vary. When spotting terrain by cutting the upper layer of soil, the labor expended on completing the indicated amount of work is as follows: when using a tank with a dozer, 3 to 5 machine-hours and 5 to 8 man-days; when working manually, 30 to 50 man-days.

In terrain spotting, emplacements and shelters are built directly on spots and camouflaged to resemble them. Breastworks and the earth around installations receive an irregular shape to distort the characteristic appearance of emplacements and shelters. Installations are not covered completely with screens, which are used only on dug-out areas (pits and entrances). Screen covers are strewn or coated with dirt along their edges and in the center. This ensures a better blending of screen and spot (figure 33).

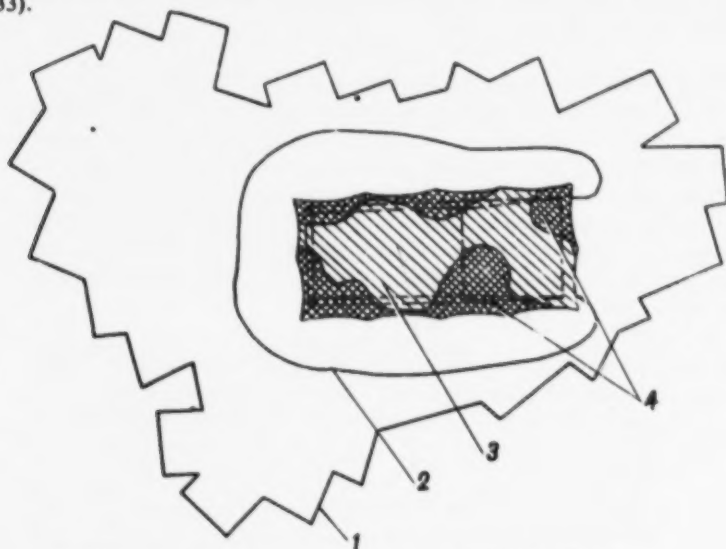


Figure 33. Camouflaging an emplacement or shelter to resemble a soil spot.

1. Border of soil spot
2. Border of breastwork
3. Pit covered with overall screen
4. Sections of cover strewn or coated with dirt

When emplacements and shelters are camouflaged to resemble soil spots, tracks formed by excavating equipment when the pits are dug should not be concealed because there will also be similar tracks at spots made with the help of machines.

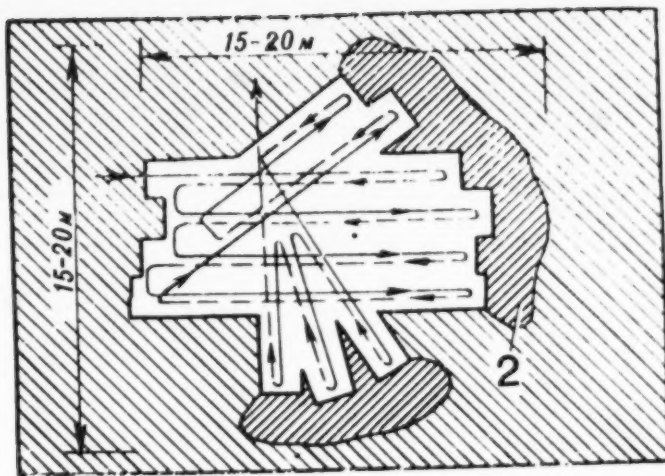
Spots created with dozer attachments should also have irregular outlines. To achieve this, when cutting the soil, equipment is run in different directions and the cutting device is set at uneven depths. When emplacements and shelters with high breastworks are being camouflaged in a spotted area, dirt is piled to form embankments to simulate installation breastworks. Figure 34 shows the sequence for operating equipment when creating a spot, and the shape of the spots created.

Equipment in open dispositions on spotted terrain can be camouflaged with regulation covers or with disruptive screens fastened to vehicles or placed against their sides. Besides using spotting and disruptive screens for equipment in open dispositions, radar camouflage must be provided for—area jamming screens made of metal corner reflectors. Jamming screens are installed in subunit dispositions (over the entire area) and also in artificially spotted areas not occupied by troops.

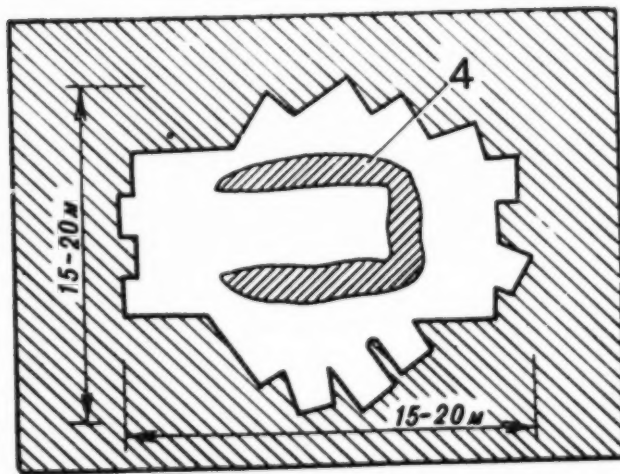
When a subunit is in a disposition as part of a unit, terrain spotting is usually carried out under the plan of the senior officer, as was done in the Great Patriotic War.

Troop concealment, especially of broken sectors when installations are being built and of vehicle tracks, is much more difficult in winter because of the snowy background. It is thus extremely advisable to assign dispositions in thick coniferous and mixed forests with a predominance of coniferous species. It is also recommended that small populated areas be occupied. Making use of them simplifies camouflage and makes sheltering personnel and keeping them warm convenient. If natural screens are lacking for subunit dispositions, sectors free of snow and areas with fresh craters from shell and bomb bursts can be used.

The MKT-S winter camouflage sets, different local materials, and, especially, snow are used to build screens. Painting combat equipment and transport a protective white or in large spotted winter dazzle paint helps to make them less noticeable.



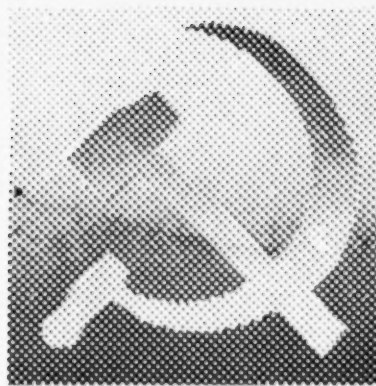
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Figure 34. Creating soil spots.

1. Sequence for operating tank with dozer attachment when creating spot
2. Excavated soil worked into the spot
3. Simulation of breastwork on spot
4. Excavated soil piled to form a high breastwork



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